

THE INDEPENDENT GUIDE TO IBM PERSONAL COMPUTERS

PC NEWS:
PC at COMDEX



Volume 3 Number 24
\$2.95

December 11, 1984

Taking Stock Compatibles Challenge IBM

Take This
Database...
PLEASE!

Framework
And Symphony
At Work

Project
Management
Part 3: More for
Your Money?



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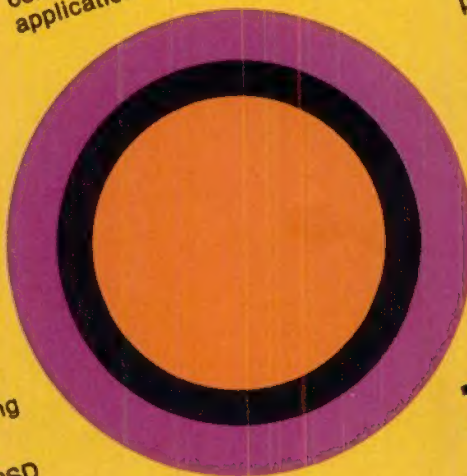
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dos

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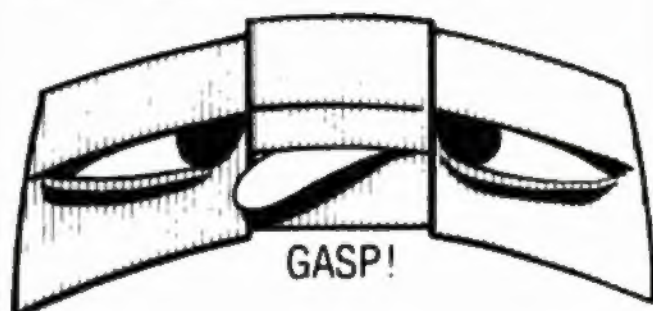
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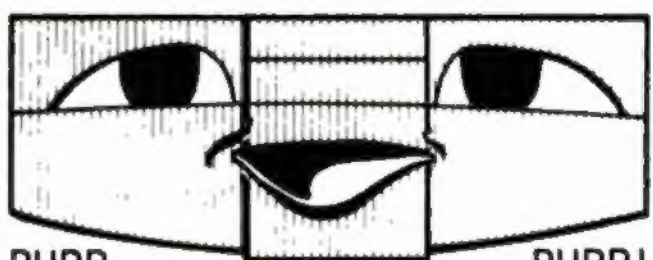
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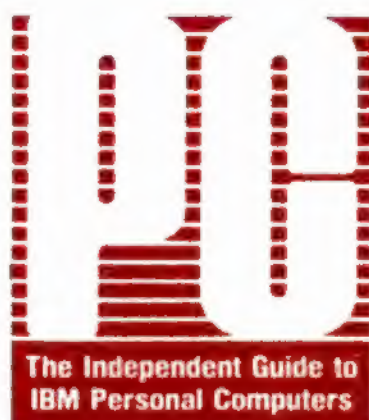
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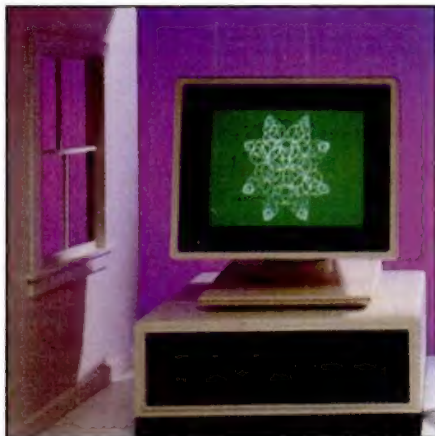


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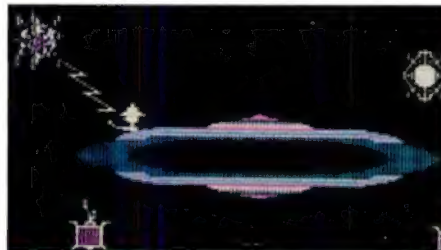
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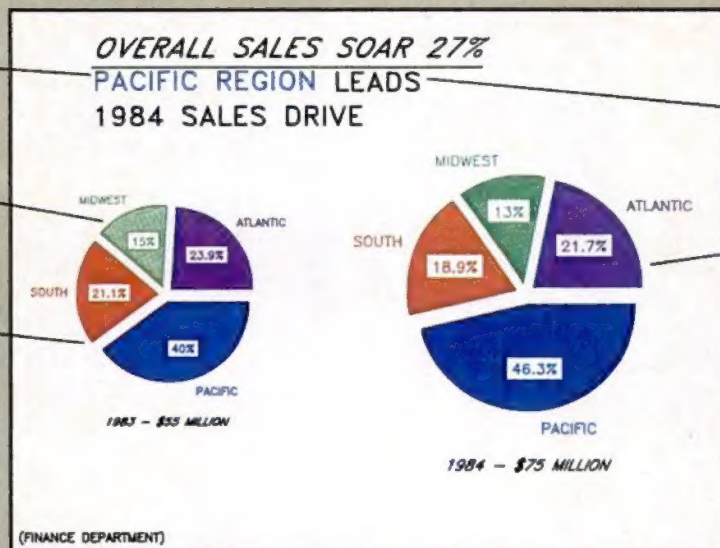
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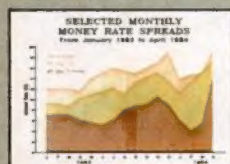
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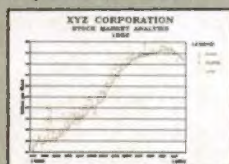
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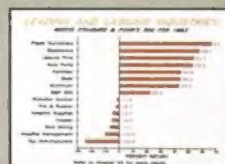
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High/Low/Close with moving average



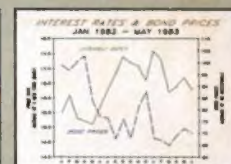
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Horizontal Bar chart



Horizontal Stacked Bar chart



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THE BOTTOM LINE
PROJECTED EARNINGS
(Millions of \$)

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Sales	96.4	121	144.0	163.8	185.4
Net Income	8.9	34.8	11.4	13.4	13.7
ROI (%)	9.3	28.7	7.9	8.2	7.4
Mkt. Share	18.7	61	67	17	6

Capital expenditure required \$5 Million
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(opportunity cost of capital = 24%)

(Source: Annual Report)

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Proposals

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Year	1983	1984	1985	1986	1987
Sales	96.4	121	144.0	163.8	185.4
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Summaries

FINANCIAL SUMMARY

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NEW PRODUCT PROPOSAL

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Tables

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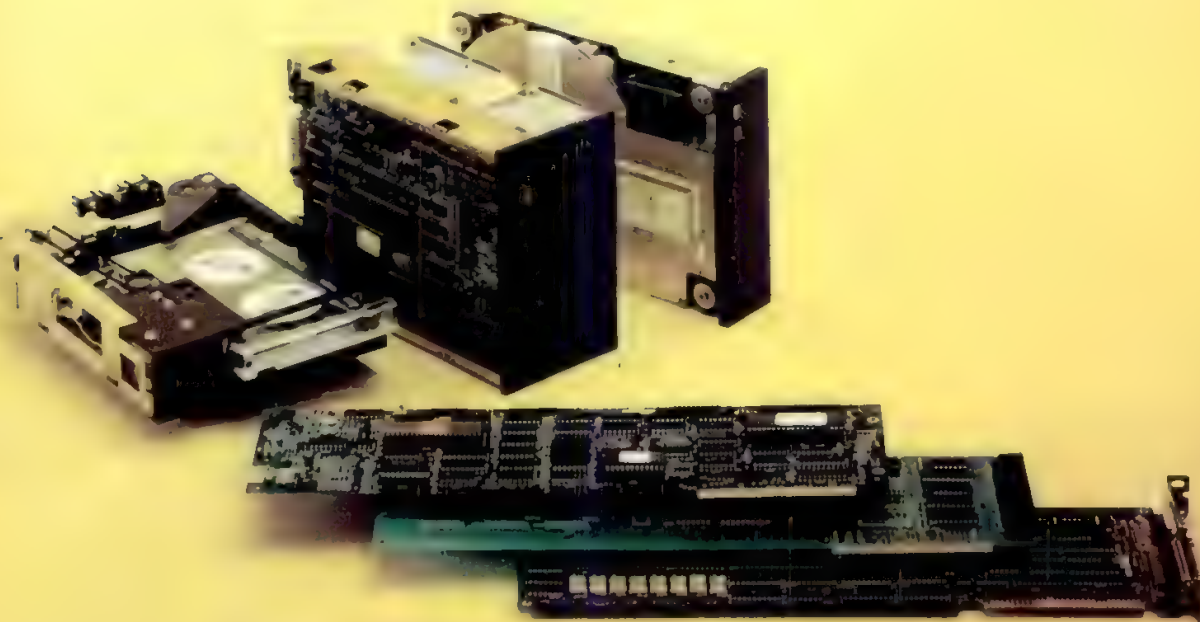
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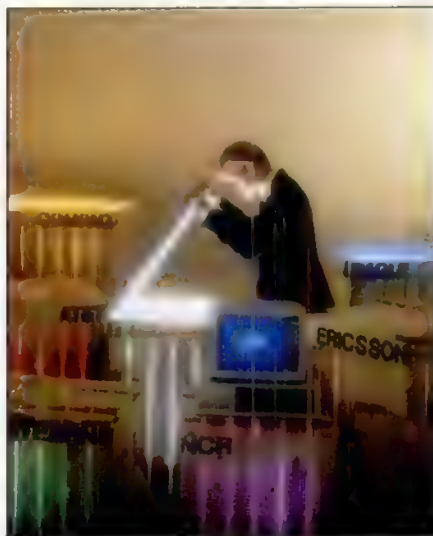
What happens to PC's deadlines when its editors are fed a healthy portion of hardware? Six PC editors and writers beat the clock while foraging through the newest PC-compatibles.

Those of our readers who have been with us through 1984 may remember the issue we did on PC-compatibles (*PC*, Volume 3 Number 6). In fact, you may even remember the What's Inside column in that issue, which detailed, among other things, the trials and tribulations suffered by the *PC* editorial staff as they gathered and tested all the PC-compatible computers available at the time.

Well, 18 issues later, a new crop of microcomputers has hit the market, and we felt it was again time to feature the latest in PC-compatibles.

But this time, we've taken a slightly different approach. For one thing, the writers who reviewed the computers covered in this issue are, with only one exception, members of the *PC* staff: Editor Bill Machrone took immediate charge of the Compaq Deskpro. Executive editor Paul Somerson examined the AT&T. Technical editor Craig Stark did his bit with the IIT XTRA and Eagle PC Turbo. Associate editor Stephanie Stallings appropriated the ADDS PC/I. Assistant editor Dave Obregón reviewed the NCR and Stearns. And contributing editor Steve Kanzler, with help from free-lancer Leslie Brown, took charge of the Ericsson.

How did this come about? How did the hardworking, overburdened editorial



staff of *PC* find the time to devote themselves to producing thorough, painstaking reviews of these sophisticated electronic machines?

Believe me—when it comes to new computers, there isn't one person here who can't come up with an odd hour or so to look it over.

A stranger to *PC*'s offices would think that this is an eminently satisfactory arrangement for all concerned—including those editors responsible for seeing that feature articles come in on time. After all, when Craig is right in the next office, Paul is constantly running past your door, and Stephanie's voice is usually within earshot, the problem of getting the

manuscripts out of their heads and into production should be child's play.

For the most part, it is. But editors are very busy people, and they do tend occasionally—just occasionally—to wait until the last minute to give in their stories. And sometimes—but only sometimes—staff members must tactfully draw a reviewer's attention to a deadline.

Editorial Brinksmanship

For example, let's say that fictional staff member Ed Itor has become engrossed in a new software package and forgotten that he had promised to hand in his computer review today. Sometime around noon, associate editor Barbara Krasnoff may carefully slip her head into his doorway and tentatively call, "Ed?"

"Mmmm?" he mutters back, intent on the multicolored graphics that have just taken control of his monitor.

"You know that review? The one that you promised to write for the compatibles issue?"

"Uh-huh."

"It's due today."

Ed looks up. "Oh, sure. I know that. It's almost done—I'll have it for you in a couple of hours."

By three o'clock, free-lance editor Posy Gering will be in the hallway in animated conference with Barbara. Krasnoff shrugs her shoulders; Posy

WHAT'S INSIDE

squares hers and marches into Ed's office. Itor is now staring glumly at a file in the process of being debugged.

"Ed? What are you doing?"

"You know, I can't understand it. I had the thing working fine yesterday, and then all of a sudden every other line disappears. . . ."

"Ed, where's the compatibles piece? You promised to have it in by three."

"Oh, sure, sure. I just have to print it out. Be with you in 10 minutes."

Around five o'clock, the staff is starting to get edgy. Several copy editors can be seen in fierce debate with Gering, Krasnoff, and managing editor Barry Owen, and phrases like "overtime" and "I don't *have* to work here" are ominously thrown about. Finally, Barry rolls back his sleeves, marches to Ed's door, and throws it open.

"Ed. . . ."

"Oh, Barry, glad you're here," Ed says, and hands him a freshly printed, double-spaced, wonderfully written manuscript. "Thought I'd drop this off at your office, but since you've saved me the trouble. . . ."

Symphony vs. Framework—Again

Another subject that we've covered in previous issues is the new popularity of integrated software systems. Two in particular—Ashton-Tate's *Framework* and Lotus's *Symphony*—have captured the minds and dollars of so many corporate microcomputer users that we thought it might be wise to reexamine these two packages from the corporate user's perspective and to test how effective they really are.

So we asked Raymond Hood, Michael Wilding, and Paul Goldner to report on studies they have been doing among Fortune 1,000 companies as to what corporations admire (and dislike) about both programs. And we chose two of our freelance writers, Ed Baras and David Kruglinski, to set up a test application to illustrate exactly where each package excels and fails.

The results of the survey and tests could greatly change the way you view both these products—and integrated software in general. At the very least, they illustrate that the efficacy of integrated software may depend more on the skills and needs of the user than on the software itself. ■

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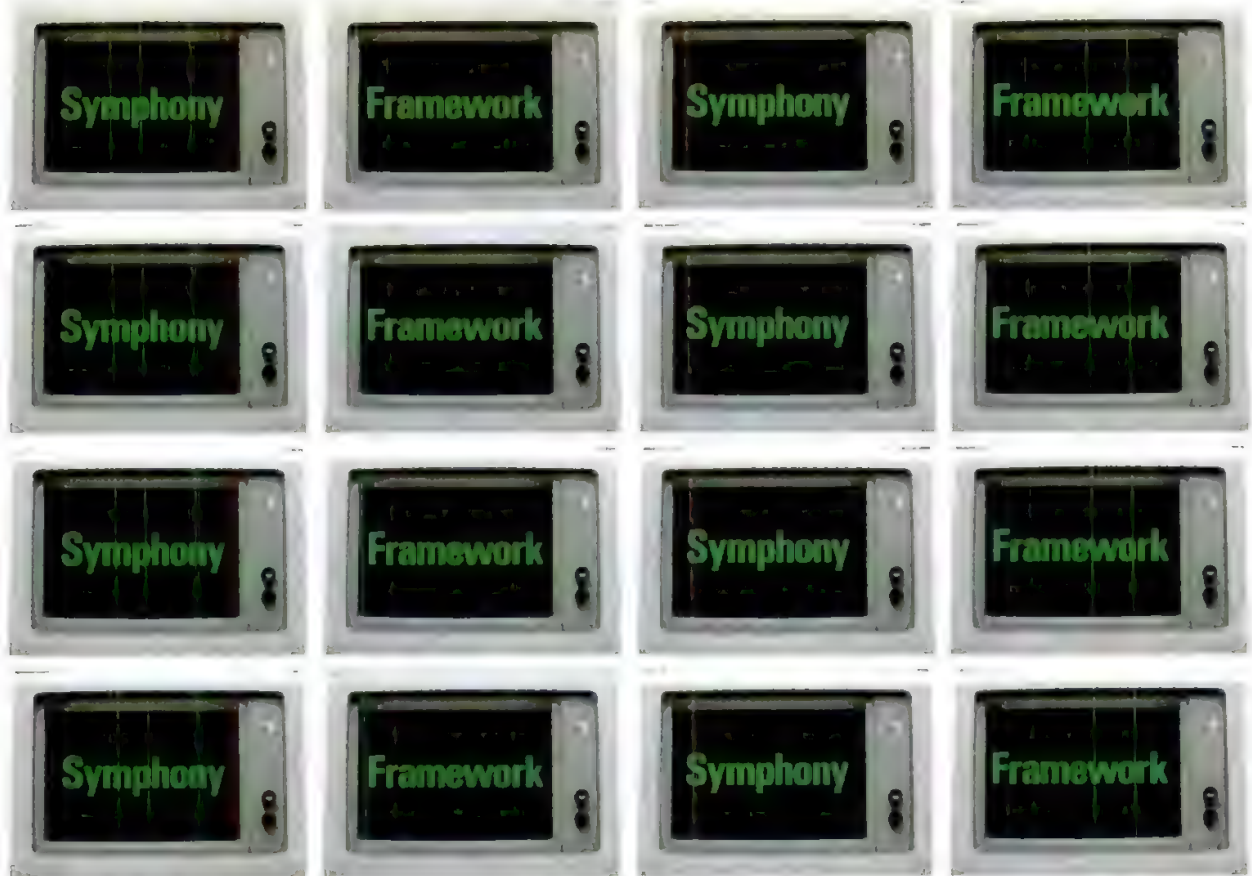
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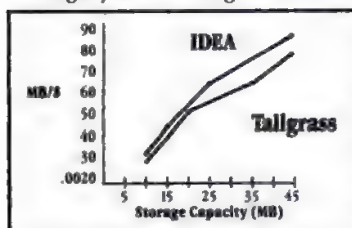
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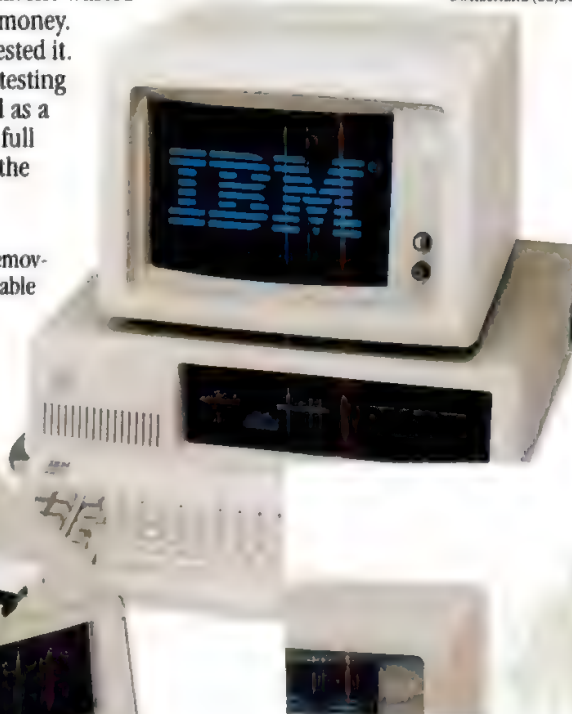
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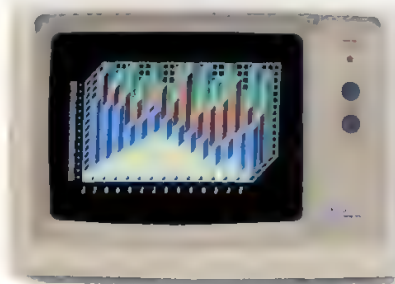


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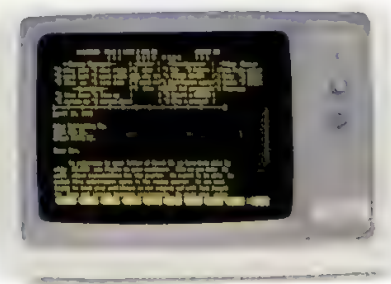


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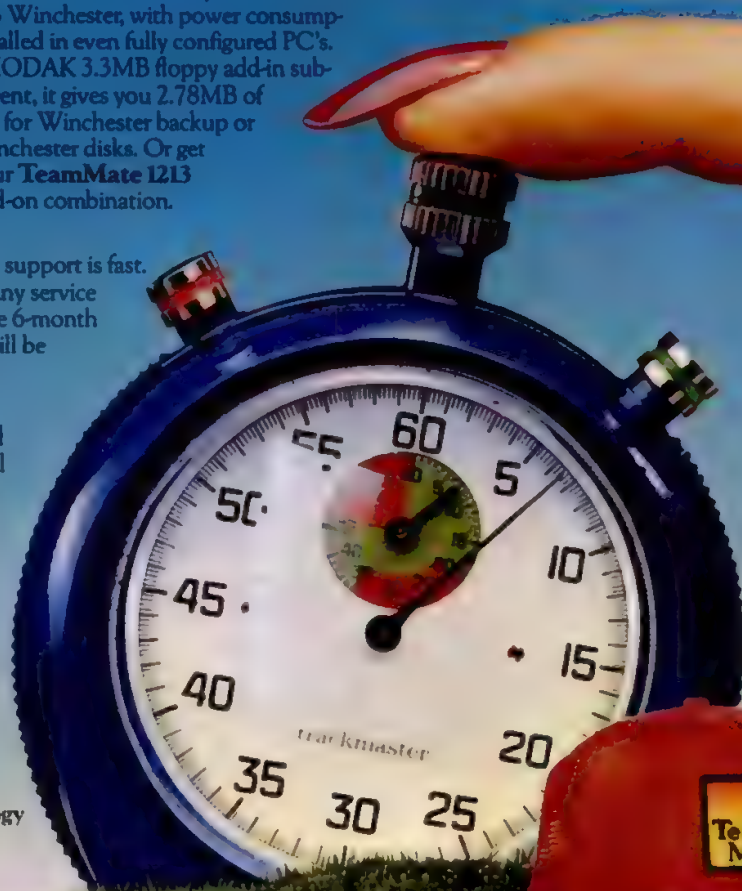
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A² Software News


FOR IMMEDIATE RELEASE:


ANN ARBOR SOFTWARE ANNOUNCES NEW VERSION OF TEXTRA WP, CUTS PRICES, UNVEILS "USE IT OR REFUSE IT" CAMPAIGN


ANN ARBOR, MI, Nov. 15, 1984—Ann Arbor Software made a series of major announcements today regarding their Textra word processor, including a novel promotional campaign dubbed "Use It Or Refuse It."


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You can have Textra for free, and pay for it if you want. But there's a catch.

 **THE REASONING** is simple. With more than 100 word processors to choose from, the marketplace is loud, confusing, and full of outrageous claims. If you're selling a word processor, it takes an extraordinary offer to be heard or believed.

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 **THE TEXTRA WORD PROCESSOR** is lightning fast, and remarkably easy to learn and use. The help facilities are stunning. It's surprisingly full-featured, and improving continuously (more on that later). Boiling it down to the essence: Textra is the shortest distance between your thoughts and the printed word.

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Many of you will be printing your first letter in 2 hours or less (with a smile on your face).

You won't even care about the catch—it's not quite as fast as a registered copy of Textra.

If you use Textra a lot though, it's more than worth the nominal fee to register. Everyone wants their programs to run faster. But you have to look to the past and the future to find the best reason for becoming a Textra owner.

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And our revolutionary new 'major/minor' upgrade policy will put powerful new versions of Textra in your hands almost as fast as you can learn them.

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PC News

FROM THE EDITORS OF PC

DECEMBER 11, 1984

IBM Stages Coup With Revolutionary Printers

New Selectric technology produces crisp, bold letter quality print at a blazing 60 cps.

BY PAUL SOMERSON

NEW YORK—After 3 years of producing solid but conservative microcomputer products, IBM has stunned the market with a rapid-fire flurry of bold, innovative hardware. Its muscular PC AT consigned an already beleaguered compatibles industry to the status of a footnote. IBM's dazzling new color boards and monitors are garnering raves normally reserved for astronauts' first awed views of a cloud-choked earth. And the company's just-announced family of revolutionary "ink-painting" printers and typewriters—from IBM's Rye Brook, N.Y. Information Systems Group—promises much turbulence for the less technologically astute in the industry.

IBM is obviously poised for a state-of-the-art blitzkrieg on all fronts. It has a clear edge in processing power, image handling, and fast mass storage and retrieval. Its rumored lap machine should carve out a hefty chunk of the market for executives on the go, and the anticipated voice/data transmission PC, developed jointly with subsidiary Rolm, has the communications world abuzz.

However, until just recently, IBM's hard-copy devices were

almost an embarrassment to the office productivity world. Its wheezing Epson printers were slow and crude, and the clattery, chug-a-lug 3550 Spinwriter was

a poor cousin of NEC's top-of-the-line workhorses. But in one swift stroke, IBM has reclaimed its share of the burgeoning printer market.

IBM's five versatile new Selectric System/2000 machines come in two main flavors—daisywheel and "resistive rib" (continued on next page)

Las Vegas COMDEX: The Show Goes On

Computer world cast takes center stage at the largest COMDEX ever.

BY DON KENNEDY



LAS VEGAS—Wayne Newton and Charo, step aside! The stars of Las Vegas in November aren't on stage. They're in the six exhibit halls displaying the wares of more than 1,500 computer companies. This month, the glittering lights on the Strip spell out COMDEX, and the neon cowboy downtown is saying "Howdy, Pardner" to the hardware and software makers of the computer world.

As the computer industry braces for the largest COMDEX ever, hardware manufacturers are preparing to unleash a (continued on page 35)

Hardware Coup (continued)

bon." IBM is offering three System/2000 typewriters (two daisywheels and one resistive ribbon), and two printers (one of each). The daisies, named "Wheelwriters" and "Wheelprinters," use fairly conventional impact technology and come with a slew of very friendly new features. But it's the "Quietwriter" resistive-ribbon hardware that will make the biggest splash.

This new generation of printers and typewriters uses special four-ply heat-sensitive ribbons, matchbook-sized interchangeable electronic cartridge fonts, and a dense 40-pin printhead to "glide" ink noiselessly onto the page at speeds of up to 60 cps. These whisper-silent printers and typewriters allow two type fonts to be used at the same time and produce dark, crisp printouts. While the print quality is not quite as sharp as that of a fully-formed character impact printer, it's awfully close, with 360 pels per inch of horizontal resolution and 240 pels per inch of vertical resolution. To assure that solid black areas are laid down dark, certain PC graphics characters are created in two passes.

Smart Set

The Quietwriter printer can reproduce virtually the entire IBM character set (see Fig. 1) and uses a subset and a superset of the standard IBM graphics printer escape codes. PC users can dump text screens, complete with high-bit border characters, to the Quietwriter. (The Quietwriter typewriter with the printer option can handle only 147 IBM characters, but, like the dedicated Quietwriter printer, it's smart enough to do things like put a slash in all zeros, underline spaces between words, and print double-wide characters in any pitch when asked.) Unfortunately, to dump bit-mapped screens, users will still have to rely on the old IBM Graphics Printer. Character sets cannot be downloaded to the Quietwriter. The Wheelwriters and Wheelprinters offer 94 character fonts on a 96-petal daisy—the period and comma are redundant.

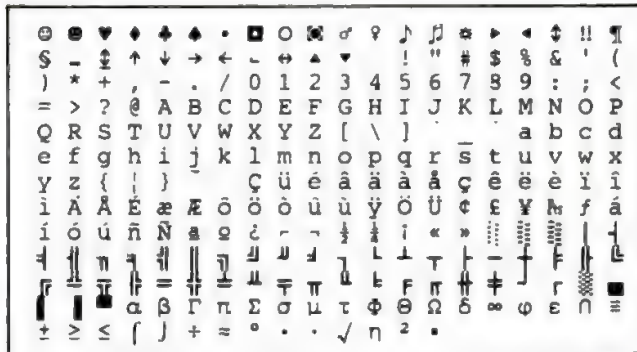


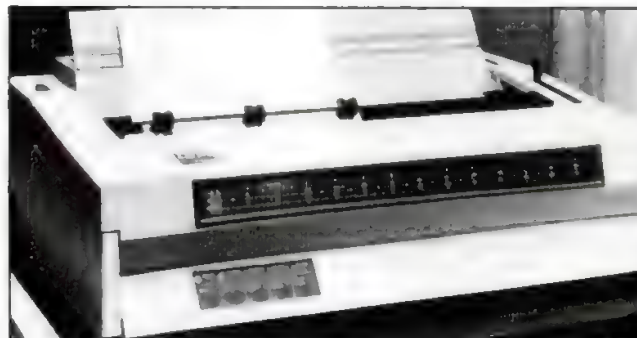
Figure 1: Sample printout from the IBM Quietwriter non-impact printer illustrating the standard and extended IBM character set.

The Quietwriter 7 uses the same 4-layer ribbon to print characters onto the page and make corrections. Its ribbon is constructed of a polymer-resistive layer bonded to a metallic layer, a glue layer, and finally an ink surface. The printhead (with a 5-million character life for typewriter use and 4 million for printer use) melts the glue and "glides" the ink onto the page when printing. To make corrections, the printhead heats

designed both the dedicated printers and the typewriter/printer interfaces specifically for IBM micros, the company admitted that its new hardware would work on most non-IBM computers with standard Centronics-compatible outputs.

Choice Systems

The three System/2000 typewriters boast some very advanced features that should make them the office machines



The IBM Quietwriter printer attaches to IBM personal computers and many PC compatibles.

the ribbon only partially, which makes the glue layer sticky, and lifts the offending ink off the page. Since the print mechanism does not make a physical dent in the paper, corrections made by the printhead are virtually undetectable.

What should make this especially attractive to most business users is that the Quietwriter 7 typewriter can also be used as a letter-quality computer printer by adding an inexpensive "feature adaptor" and a printer option card. (The two Wheelwriter typewriters can be converted into impact computer printers as well, but operate at a maximum speed of only 16 cps, or 13 Shannon cps.) While IBM

of choice. IBM claims to have done rigorous and extensive testing to learn which features typists want most, and the results are evident. Platen knobs are now an anachronism—these machines pull in paper semi-automatically; and four special keys can align the paper precisely once it's loaded, either in half-line (useful for super- and subscripts) or 1/48-inch increments. The keyboard angle can be adjusted. Every typing need can be selected and attended to from the keyboard, which retains the distinctive look, feel, and sound of the Selectric keyboard.

The Quietwriter 7 and Wheelwriter 5 typewriters offer

automatic carriage return and indentation features and contain multiline buffers that allow corrections to be made on previously typed lines; the less-expensive Wheelwriter 3 limits corrections to the current line. A "relocate" key automatically returns the user to the last typing position after a correction.

Other snappy features allow easy underlining and centering, decimal alignment, one-stroke margin and tab setting, and a simplified color-coded control key operation. Single keystrokes can change the "personality" of the machine to convert the keyboard to French, Italian, or a host of other foreign layouts. The typewriters and printers can handle 10-, 12-, or 15-pitch type, as well as proportional spacing. The Quietwriter 7 offers 19 electronic fonts; the Wheelwriter 5 provides 38 possible daisywheels, while the Wheelwriter 3 allows users to select from 33 typestyles.

White-Glove Loading

Cartridge and "white-glove" ribbon loading are unusually simple. For instance, Wheelwriter daisywheels simply drop into place; the firmware automatically senses which font has been loaded and adjusts the proper pitch and impression strength. And the chassis contains small pop-up trouble-shooting and general help guides. One other nice feature is that the Quietwriter printer, which does not operate in the traditional line-buffer mode (although it has a 1,500-character buffer), can be used as a "key-to-print" machine so that PC operators can type on the PC keyboard and have the text sent to the printer without having to first hit a carriage return. All of the hardware can handle 16½-inch-wide paper.

But perhaps the most astonishing optional feature of all is a real-time on-line spelling checker with a dictionary of 50,000 common words and the ability to store another 300 user-defined words or names. If you type "teh" rather than "the," the checker will beep softly at you as soon as you hit the space bar. Combined with the efficient correction mechanism, this should

make the System/2000 typewriters a major timesaver and a big hit around any office. IBM is also offering an optional 23-character LCD display for the Quietwriter 7 and Wheelwriter 5. Both of these machines contain 7K of RAM, or about four pages of text.

Businesses that have extensive printing needs will proba-

parts, the new machines use about 900. Selectric manufacture required 72 precise adjustments as it was made; the new hardware needs only 9.

IBM produces nearly all the parts itself, and inventories raw material on a Theory Z "just-in-time" basis. Over 100 specialized robots (largely Boca-built IBM 7535s and 7540s) are fed

as a package for \$300. A \$30 acoustical hood is also available. The Quietwriter printer tractor is currently available and sells for \$75; the cut-sheet feeder, at \$350, will go on sale in the second quarter of 1985. Quietwriter font cartridges will cost \$50, and the replaceable 40-pin printhead only \$20. Ribbons will cost \$12.00-\$13.50. A serial interface version of Wheelprinter is expected in January of 1985.

IBM is planning to market the entire System/2000 line through its product centers. Typewriters will be sold through authorized IBM typewriter dealers; printers will be marketed through authorized IBM computer dealers, value-added dealers, and specially qualified authorized IBM typewriter dealers. Supplies will be sold through IBM product centers, authorized dealers, and the expanding 800-number direct sales operation. IBM's national account and national marketing division will handle volume purchases.

Fast-Silent Type

IBM has sparked three typewriter revolutions: the first in 1935 with its initial Model 1 electric typewriter (which sold for approximately \$250), the second in 1961 with its Selectric 1, and now, roughly 50 years since the introduction of the Model 1, with its fast, silent, crisp Quietwriters. And since the Quietwriter can double as a speedy, letter quality PC printer, businesspeople who don't need to keep a printer busy all day long can buy this state-of-the-art typewriter and avoid the expense of dedicated printers for their PCs.

"We've done what other manufacturers have all been trying to do for years—improve the Selectric," one senior IBM official crowed. "We're serious about typewriters and letter quality printers, and we intend to remain a world-class force." With this new generation of sleek, currency-crisp, lightning-quick, silky-silent printing devices, IBM shouldn't have much of a problem—except making and distributing them fast enough. ■

COMDEX (continued from page 33)

spectrum of hard disks, storage peripherals, and high speed modems that will impart even greater variety to the computer market.

While virtually every hardware manufacturer will be seen at COMDEX, not all will be adding to their product line. Many have already found that the massive show is a good place for display, but introductions of new products seem to get lost in the crowd. Other companies feel that an already strong product line is not benefited by introduction for its own sake.

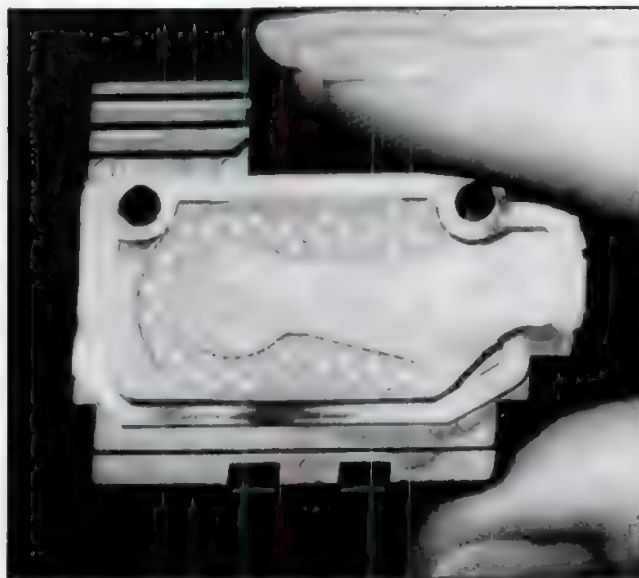
Furthermore, many of the computers and peripherals being "introduced" at COMDEX have either been available for months or will not be released until the first quarter of 1985.

On the software side, while none of the heavyweights indicated an intention to make a major announcement, many smaller vendors have chosen to introduce new products and enhancements. Enhancements, in fact, seems to be the operative word at this year's show.

This desert town is known for its "anything goes" attitude. Yet, in this highest of high-stakes towns, this year's COMDEX exhibitors seem to be shying away from show-stopping announcements. Instead, many are spotlighting recent products announced prior to the show. In general, the new products being unveiled can best be described as the next step in technological development, rather than the "giant leaps" that have in other years kept the casinos and hotels buzzing well into the night.

As Deborah Barlow, director of marketing for Graphic Communications in Waltham, Mass., said in October, "All of the local printers have been swamped with material in anticipation of COMDEX, but I haven't heard one leak about anything spectacular. It's as if they were butressing their position, but there is really nothing new."

PC News reporters contacted many of the exhibitors to this year's Las Vegas COMDEX to get a sense of what the show's flavor and style would be. Their reports follow. ■



New 40-pin Quiet Electronic Printhead displayed in front of Quiet Correcting Ribbon

bly want to investigate the System/2000 printers rather than the adapted typewriters, as the printers offer far better form handling. The standard Wheelprinter contains an integrated single-sheet feeder as well as a tractor and runs at speeds of up to 25 cps (18½ Shannon cps). The Quietwriter printer comes with an optional tractor or sheet-feeder and prints at burst speeds of 40 to 60 cps, depending on the pitch selected.

Made in Kentucky

All of the System/2000 typewriters and printers are manufactured in a wholly revamped 28-year-old plant in Lexington, Ky., that IBM engineers claim sets new standards in hardware manufacturing. The same assembly line makes all five products, which were created with a "layer design" that allows each to be built from the bottom up. The parts, in the words of one proud IBM executive, "literally snap together." And there are far fewer of them. While the old Selectrics were made of 2,700

by 5 miles of conveyor belts, and the entire operation is supervised by various IBM Series 1, System 4341, and even PC computers. All of this keeps the quality up and the costs way down, helping thwart the competition. It also prevents many service headaches later.

Happy New Year

The Quietwriter 7 typewriter, priced at \$1,295, will be available in January. All of the other machines and most of the add-ons are available now. The Wheelwriter 5 typewriter sells for \$1,045, and the entry level Wheelwriter 3, with no upgrade to the LCD display, is priced at \$795. The Quietwriter printer goes for \$1,395, and the Wheelprinter, with its standard sheet-feeder and tractor, sells for \$1,795. To add any options to the Quietwriter 7, you first have to buy a "feature adaptor" for \$60. The Spell Check and PC printer options each list for \$150, and the LCD display for \$165. The printer option and LCD display can be purchased

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You can find a more economic way to learn C, but if your interest is program development, Lattice C™ is the unparalleled choice. Byte said "the Lattice C compiler produces remarkable code . . . outstanding in terms of both execution speed and code compactness". After reviewing nine compilers for the PC, the *PC Tech Journal* unequivocally declared Lattice C "best for software development . . . it compiles fast and produces fast programs".

Lattice C is a full implementation of Kernighan and Ritchie, not a subset, and even offers extra features such as nested comments, 39-character variable names and extra compile time checks for some of C's subtler errors. The compiler comes with a full library of I/O routines which implement under MS™-DOS most of the Unix-compatible standards described by Kernighan and Ritchie.

Lattice C runs on virtually any computer using an 8086 or 8088 microprocessor, and we carry two versions for either PC-DOS™ or CP/M-86™. Create your source files with any word processor or text editor like Edlin or our Pmate™ and Lattice C will compile them into Intel 8086 object module format ready for linking with other modules by linkers such as DOS' Link or our Plink86™.

Lattice C offers a choice of four memory models which allow the program designer to choose the right combination of efficiency and size for an application: a range between 64K and a full megabyte for program and data area size.

The documentation, which Byte says "sets such a high standard of excellence that others don't even come close", features sample source programs and covers the interface to assembly language and machine dependencies.

C's structured approach encourages development of tight, fail-safe functions which can be counted on to return reliable results every time. Local variables unknown outside of functions to safeguard against collision. Extremely powerful nested expressions which produce elegant, concise code.

Requires 128K RAM.

For PC-DOS: Product Code: S0100

For CP/M-86: Product Code: S0120 Our Price:

Suggested Price: \$500.00 **\$295.00**

HALO

A Spectacular Graphics Extension to Lattice C

PMATE

The Programmer's Word Processor

Pmate was designed for programmers. We'll wager that you cannot find a programmer who has discovered Pmate and moved on to something else.

Pmate is a full screen editor with ten auxiliary buffers for squirreling away pieces of text until needed. It uses single key commands to move the cursor, or text, or insert or delete, or rescue several thousand characters of deleted text.

It has a format mode for tab setting or wraparound and shaping when it's time to write documentation. Pmate lets you assign chains of commands or strings of text to single keys: one keystroke could set up the entire shell of a new C function, for example.

Pmate has variables, if-then statements, loops. It calculates, and converts decimal to hex to binary and back. You can write compact programs (called "macros") to delete comments, for example, or check syntax, or process long sequences of commands. Macros can alphabetize lists, do row and column math, perform a series of operations on multiple files, even summon other macros.

Put another way, Pmate is a text editor with its own built-in interpretive language. A language you can use to completely customize this text editor to your fancy. Possibly the most artful, ingenious program you have ever seen.

Halo™ will astound you. It provides a complete library of graphic functions which can be linked with your Lattice programs to create full-color charts, graphs, simulations, even animation.

Over 100 commands are at your disposal, including plot, line, arc, box, circle, plus single commands to produce bar graphs and pie charts. Pattern-fill and dithering commands give your graphics impressive texture and color mixes, rubber-banding draws shapes for interactive users, area moves produce animation, fill and flood commands paint areas. The newest version allows you to define your own world coordinate scheme, divide the screen into "viewports" (windows), and scale graphic figures automatically.

It's a long list of capabilities which make for an extraordinarily powerful product. In fact, Halo is so good that manufacturers of graphics boards and systems are adopting it as a standard graphics language. So it can bridge your application to other systems. CAD-CAM developers, especially, have embraced its device-independent approach for maximal portability.

Halo is a dazzling demonstration of why C has become the language of choice among programming professionals: its function library architecture means you can tremendously enhance your firepower by acquiring libraries of software like Halo with dramatic economy of time and money.

Requires IBM monochrome or color graphics card or equivalents.

Product Code: S0300

Suggested Price: \$200.00

Our Price:

\$125.00

Product Code: S0600

Suggested Retail: \$225.00

Our Price:

\$175.00

PLINK86

Overlay Linkage to Expand

Software is becoming ever more sophisticated, which means more complex programs requiring large chunks of memory. But if you use extra memory, if you count on users to have expanded RAM, you will forego sales to those who do not.

Plink86 is the answer. It takes on the job of shoe-horning large programs into small memory. First, Plink86 acts as an alternative to DOS' Link. For a language like C which encourages design of separately compiled object modules in the Microsoft relocatable format, Plink86 pulls modules together into single compiled programs. But Plink86's overlay power is what has gained it a reputation as a miracle worker. It binds into the compiled program its overlay manager which knows how to swap modules of your large linked program between disk and memory, so that each can temporarily occupy the same memory space.

Unlike other linkers, the overlay manager acts on its own, needing no calls from the source program. Instead, Plink86's straightforward overlay description language allows you to describe your overlay structure in one place in your program — a structure

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TIP, the terminal independence package: Lets you easily move programs to computers with different types of terminals.

There is a basket of delicacies beyond this brief list; a cornucopia to sample, any one of which will save valuable time and pay back far more than C-Food Smorgasbord's overall price.

Product Code: S0200
Suggested Price: **\$150.00**

Our Price:
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All products operate on the IBM PC or PC/XT under PC-DOS and require no more than 64K of RAM unless indicated.

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Panel can also create a terminal selection program customized for your application, and gives you a utility to quickly test your finished screens. It even includes a multi-key data file maintenance program which interacts with the screen you design. All the tools you need to generate code for the trickier aspects of your application, or even to create stand alone data entry and retrieval products without any programming.

Panel routines are powerful. Unlike so many programs which make error correction difficult once a field is departed, Panel gives the user full field-

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Float-87™ is a library of floating-point math routines which are merged into a Lattice C interface library. The routines handle all arithmetic functions and the most frequently used transcendental or trigonometric functions, and pass all numbers to the 8087 to take advantage of its 80-bit data format.

Putting Float-87 to work with an 8087 can increase the speed of floating-point calculations by 40 times or more — and with greatly expanded accuracy. If you or your customers have an Intel 8087 math processor chip on board, this software will switch on its afterburners.

Product Code: S0700
Suggested Retail: **\$125.00**

Our Price:
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permitting up to 4,095 overlays stacked 32 deep. And you don't have to re-compile to re-arrange the structure.

Plink86 is a two pass linkage editor. On the first reading it determines all modules which need loading, to insure greater flexibility in assigning memory segment addresses before the disk file is created on the second pass. It can even sub-divide its linked output into multiple files for programs which must span more than one disk.

But most of all it sets you free to write the comprehensive code today's users have come to expect without sacrifices to memory constraints.

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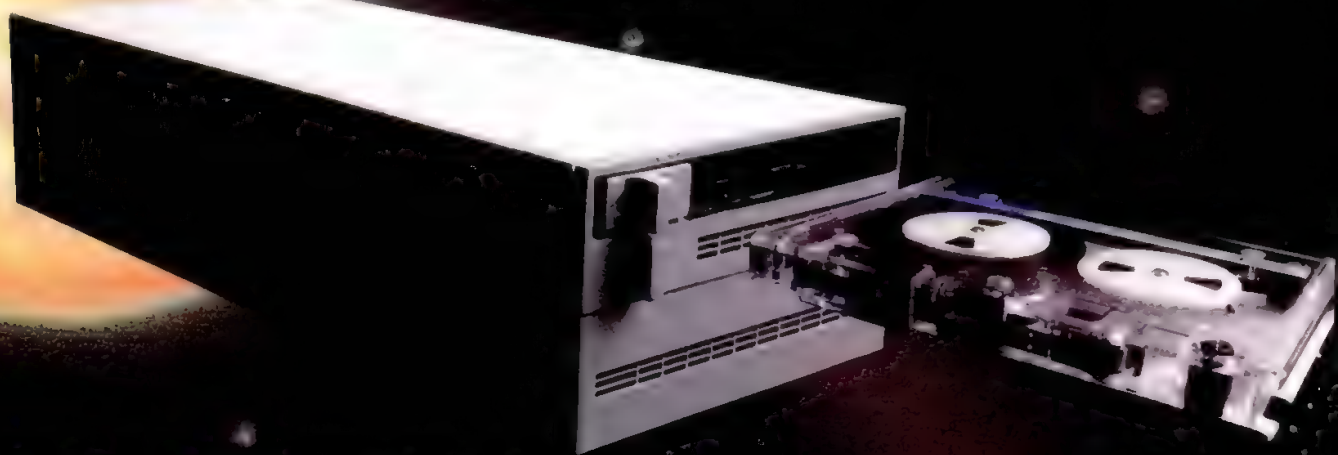
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CHAS/OFCE AT.

News In Brief

Data Banking...Citicorp Information Services has announced two new data-access software packages for the IBM PC and PC-XT: **Citiquote Investor** and **Citibase Connection**.

Citiquote Investor allows users to perform basic portfolio evaluation and analysis. The software enables users to screen securities for a specified investment criterion and generate price histories, position reports, and dividend and interest performance histories. Daily updates of information on 61,000 stocks, bonds, and options are available on Citicorp's own securities database, Citiquote.

Citiquote Investor requires a minimum of 128K RAM and two floppy disk drives or one floppy and a hard disk drive. The software costs \$395, and there is a time-sharing charge that ranges from \$8 to \$96 an hour for accessing Citiquote.

Citibase Connection enables users to connect their PCs to Citicorp's United States economic database, Citibase. **Citibase Connection** automatically dials a local telephone number, signs on to Citibase, requests data from Citibase's time series, and then stores the information on a floppy disk.

Citibase Connection costs \$295 plus a yearly subscription fee of \$2,250 and a flat time-sharing fee of \$15 per hour. Fred Schulman, product manager for **Citiquote Investor**, says Citicorp's two new programs do not yet run on the PC AT.

Interesting Development...Eastman Kodak has announced a series of products designed to eliminate the negative aspects of photographing display screens.

At the top of the line is the **Kodak Instagraphic Color Slide Film**, which has a film speed of ISO 64 and rivals Kodak's Ektachrome 64 in overall quality. As the name Instagraphic implies, this is an instant transparency film, and it develops itself in about 12 minutes (the time varies somewhat depending on ambient temperature). The quality seems superior to that of the existing instant color slide film from Polaroid.

The picture is ejected from the specially designed Kodak Instagraphic camera back, which is part of the **Kodak Instagraphic CRT Slide Imager**. The slide imager also includes a cone adapter that fits over the screen and comes in different sizes to fit 9-, 12-, 13-, and 19-inch screens.

The transparency is of the Kodak Trimprint design, with a peel-away back. You place the oversized transparency in the **Kodak Instagraphic Slide Mounter** together with a plastic mount to get a neatly trimmed and mounted 35mm slide.



Kodak's Instagraphic CRT Slide Imager with cone adapter.

For even higher quality CRT imaging, adapter backs are available for the **Beseler Film Recorder (Model 4500)** and will become available for other video image recorders.

Suggested list prices are \$339 for the slide imager, \$40 for the 9-, 12-, and 13-inch screen adapters and \$50 for the 19-inch adapter. The slide mounter carries a price tag of about \$75. Kodak states that individual slides can be made for \$1.30 and the film sells in packs of ten frames.

Sharpening AT&T's Image...Less than one year after the deregulation that altered the makeup of this massive telecommunications company, AT&T has introduced products it hopes will as radically change the face of color computing.



The AT&T Video Display Adapter (shown standing at the left of the AT&T PC).

The **AT&T Video Display Adapter**, **Image Capture Board**, and **NAPLPS Decoder** are competitively priced PC-peripherals designed to make higher-quality graphics available to a mass audience. When they were demonstrated at a New York news conference, using Sony television monitors in conjunction with a video camera, the computer-generated images were sharper and more realistic than usual PC graphics fare. AT&T representatives insist that the quality would be the same with analog RGB color graphics monitors.

AT&T states that the products were developed for its own PC but were also designed to work on computers "that may have been purchased before the AT&T became available"—an interesting twist on IBM compatibility. In addition to the AT&T, a PC-XT and a Compaq with a hard disk were used in the New York demonstration.

The peripherals will not be widely available until next year (although they are already obtainable by OEMs and VARs), and AT&T is not offering a wide variety of compatible software. "The applications will be determined by users in residences and businesses, not by us," says AT&T Consumer Product's Alan Wlasuk. "This is a new approach to potential applications. Rather than thinking of all of them ourselves, we're throwing it open to the independent software developers."

Hard Times Ahead...The Gavilan Computer Corporation, an early entrant in the portable computer market, has filed for **Chapter 11** and will seek protection from bankruptcy. The Campbell, California, company has laid off over 200 employees and stopped producing its products.

Although a company representative claims that Gavilan has not officially folded and that president David Vaughn is trying to reorganize the company, Gavilan's future does not look bright. The company has a history of production delays and management problems, and is \$10 million in debt.

—compiled by Charles Bermant, Jane Mintzer, and Jack Neubart

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Microcom II w/Smartcom	\$ 329	\$ 239
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Stack Chronograph (RS-232)	\$ 249	\$ 189
Stack Smartmodem 300RS-232	\$ 289	\$ 225
Smartmodem 1200 (RS-232)	\$ 699	\$ 499
IBM PC to Modem Cable	\$ 39	\$ 29
KENSINGTON Modern 1200	NEW \$ 595	\$ 385
NOVATION 103 212 Smart Cat	\$ 595	\$ 415
ACCESS 1 2 3 11200B + Crosstalk (V)	\$ 595	\$ 369
Apple Cat II 300 BAUD	\$ 389	\$ 249
212 Apple Cat 1200 BAUD	\$ 725	\$ 559

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*QUADRAM Quadchrome 12" RGB Color	\$ 695	\$ 495
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* Quadchrome II 14" RGB Color	NEW \$ 650	\$ 450
* Amberchrome 12" Amber	NEW \$ 250	\$ 165
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10 each MD2 DS/DD	\$ 75	\$ 26
VERBATIM 10 each MD515-01 SS/DD	\$ 49	\$ 27
10 each MD34 DS/DD	\$ 84	\$ 32

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Software At COMDEX: Enhancements Galore

BY VIRGINIA DUDEK

LAS VEGAS, Nev.—Software vendors seem reluctant to put all the chips on the table at this fall's COMDEX. With the exception of MicroPro's unveiling of *WordStar 2000* (see *PC*, Volume 3 Number 23, p. 33), most major players reported they are not making dramatic announcements. This COMDEX offers the chance for smaller vendors to gain attention and large vendors to re-emphasize previously released products.

Program enhancements dominate the list of what's new in software at COMDEX. Fortunately, most developers will keep the old prices for revisions. Here's a look at some of the software being showcased this year.

Satellite

Satellite Software International, Orem, Utah, is announcing *WordPerfect 4.0*, which includes several enhancements of Version 3.0. In addition, SSI has completed the conversion program to allow documents created with *WordPerfect* to be interchangeable with documents in the DCA, Kermit, and DIF formats.

Users of IBM Displaywriters and *DisplayWrite II* for the IBM PC, PROFS, IBM 3270s, and IBM 8100s may convert their documents and transfer them through DISOSS. The conversion program will be included with *WordPerfect 4.0* and is being released at COMDEX.

WordPerfect 4.0 now has a larger, 85,000-word dictionary, automatic insertion of the correct word for a misspelled word, phonetic spelling lookup, and enhanced footnoting. Other improvements include highlighted blocks, word count, enhanced printer management, and the ability to change the cursor to any character.

WordPerfect 4.0 is designed

for the IBM PC, XT, AT, and compatibles. It requires 128K RAM with DOS 1.1 and 192K for DOS 2.4. Suggested retail price remains \$495. Updates to 4.0 cost \$20 for documentation and template and \$20 for the software.

Microsoft

Microsoft Corporation of Bellevue, Wash., is promoting *Microsoft Spell*, a version of the best-selling *Word Plus* spelling-correction program from Oasis Systems that is designed specifically for *Microsoft Word*. *Microsoft Spell*, first announced in mid-October, will be offered free with all purchases of *Microsoft Word* through the end of 1984. It requires any version of *Microsoft Word*, MS-DOS 2.0 or a later version, and 128K RAM. It is also available as a standalone package for \$50.

Microrim

Microrim, Inc., Bellevue, Wash., is demonstrating its *CLOUT Version 2.0*, a natural language query system designed to access the data files of several software programs with-

out using the standard command syntax. Announced in late October, *CLOUT 2.0* lets users write files using their own words instead of relying on the program commands. *CLOUT* simplifies the retrieval and analysis of data from *R:BASE*, *dBASE II*, *PFS:FILE*, and *1-2-3* files, as well as DIF, SYLK, and ASC II files. *CLOUT* also works with mainframe files imported to a personal computer.

CLOUT requires 256K and retails for \$249.

Lifetree

Lifetree Software Inc. of Monterey, Calif., is announcing *Volkswriter Scientific*, a bit-mapped word processor designed for the engineering and scientific communities. It features more than 400 scientific and mathematical characters, multiple type styles and sizes, plus the Roman and Greek alphabets for on-screen text composition. The user can also customize fonts, scientific symbols, and so on using the individual pixels of the computer screen. Before *Volkswriter Scientific*, scientific word processing had to be done on a mainframe computer by generating batch files in the processing mode.

Volkswriter Scientific retails for \$495.

Peachtree

Peachtree Software, Inc., At-

lanta, Georgia, is demonstrating a new version of *Decision Manager* for small and medium-size business users. This version of the integrated program omits the mainframe-to-micro link, on the assumption that smaller companies and offices do not have access to a mainframe terminal. Also, smaller users don't need the high-level accounting software used with a mainframe computer.

The new version has an accounting interface so that users can use smaller accounting programs like those from Peachtree. The new version requires an IBM PC-XT with 256K or an IBM PC with a hard disk.

Peachtree also announced that three out of seven volumes of the Peachtree Home Software Library are now unbundled: *Peachtree Home Accountant*, *Home Analyst*, and *Home Writer*.

Human Edge

Human Edge Software Corporation, Palo Alto, Calif., is featuring the *Mind Prober*, the latest release in its line of software to help users in business and personal relations. From information the user supplies, the system develops a report to reveal the motivations, strengths, and weaknesses of the person being probed.

The *Mind Prober* retails for \$49.95.

Sorcim/IUS Micro

Sorcim/IUS Micro Software of San Jose, Calif., is showing its latest product, *SuperProject*, a project planning program. The project scheduler uses Gantt and PERT chart techniques that allow project designing on-screen. Schedules and the critical path are calculated and displayed automatically. Users can create a *SuperCalc* spreadsheet from within *SuperProject* to design reports and extend "what if" calculations. Project data can also be converted to ASCII, DIF, and CSV formats for use with other spreadsheet and database programs by using the included SuperData Interchange.

Suggested retail price for (continued on page 48)

The Vegas Connection: Networking At COMDEX

LAS VEGAS—Many of the major booths on the main COMDEX floor at the Convention Center here are linked together by a sophisticated local area network.

A broadband "backbone" is installed in the floor, into which about 45 modem-equipped PCs are hooked. LAN-PC, a local area network from 3-M, is used in conjunction with an operating system developed by Novell Data Systems, of Orem, Utah.

The idea was conceived last year, but Novell, and 3-M didn't start on the project until two months before the convention.

COMDEX attendees are able to leave individual messages and mass communications on the system, and a multiuser Trivial Pursuit-style game, complete with prizes, will be going on continuously.

"Networks have become such a buzzword," says Thom Olson of MAI in Albuquerque, who has developed the project's software. "But not many people know what actually can be done."

—Charles Bermant

Potent Pascal.

Microsoft® Pascal may be the most powerful software development environment available for the MS™ DOS system. It combines the programming advantages of a structured high-level language with the fast execution speed of native code compilation.

And it exceeds the proposed ISO and ANSI standards with logical extensions that make the language more powerful and versatile. For example, programming capabilities even allow you to manipulate data at the system and machine level.

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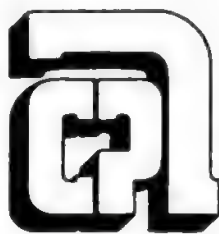
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Putting the Pinch On Chip Pirates

Congress passes copyright laws to protect semiconductor chip designs.

BY LINDA SANDERS

A new law that protects semiconductor chips from piracy in much the same way that copyright laws protect written material may generate more innovation in chip design, according to those involved in chip production.

The new law, which passed the House of Representatives October 9 with no opposition, protects chip designs from unauthorized reproduction for 10 years. Experts say it will help make the expensive research needed to produce a new chip more profitable for the manufacturer, encouraging more companies to develop designs.

Chip manufacturers such as Intel Corporation, which designed the chips all IBM microcomputers are based on, have pressed for such protection for several years. They argue that design of a semiconductor chip can cost as much as \$100 million, but that pirates can reproduce the chip for as little as \$1 million. The pirates can then sell the copied chips for far less than the original manufacturer does, in effect stealing a share of the market.

"All we have to sell here at our company is our intelligence," says Michael Maibach, government affairs manager for Intel. "It's sort of like a songwriter writing a song without a copyright. There's no way to protect your work."

Jon Tammel, vice president of marketing and sales for Zilog Inc., which also manufactures microcomputer circuits, says, "The strength and protection of the design (of a semiconductor chip) is crucial because the design is the essence of a high-performance product."

With protection in place, experts say, chip designers will be more likely to introduce innovative designs, since the orig-

inating company will receive all the profits associated with the design for 10 years.

Innovations Likely

"For at least 10 years, piracy has been a serious problem," says Timothy J. Richards, an economist representing the Semiconductor Industry Association. "Now we have a much, much better situation. Immediately, there will be no direct effect on the end user, but I think it will lead to the development of more innovative chips."

Even though the new law will cut out many of the lower-priced reproductions, experts say they do not think the increased price of chips will mean higher prices for the consumer.

"The price of the chip itself is a small percentage of the computer," Intel's Maibach says. "If anything, the price is going to be determined by the competition out there."

"I don't know that this will have much effect on pricing," says Jim D'Arezzo, vice president of corporate communications for Compaq Computer Corporation. "I'm not sure what effect piracy has had on the marketplace. But it will help protect all the investment and hard work that designers put in."

Foreign Protection

Chip manufacturers also have worried that unlimited copying of American designs has given their Japanese rivals an undeserved edge. One of the bill's chief sponsors believes the new law will help American companies protect their designs, at least for U.S. manufacture.

"Never before has there been any law that protects these designs," says Ann Pincus, press secretary for Senator Charles Mathias, Jr., of Maryland, one of the key sponsors. "The U.S.

Software (continued from page 42)
Super Project is \$395.

Also showing at COMDEX are *SuperGraph*, a presentation graphics package, an enhanced version of *SuperCalc III*, and the *Easy Business Systems* accounting module.

Quarterdeck

Quarterdeck Office Systems, Santa Monica, Calif., is continuing to demonstrate DESQ, a multiwindow software integrator that works with off-the-shelf applications software for personal computers using PC- or MS-DOS.

Software Publishing

Software Publishing Corporation of Mountain View, Calif., is demonstrating *PFS:PLAN*, its new spreadsheet package, along with the rest of the PFS line. A main feature of *PFS:PLAN* is that keywords are used to perform common calculations such as growth projections, payments on loans, and average values. *PFS:PLAN* runs on select MS-DOS personal computers, requires 128K, and sells for \$140.

Software Publishing also announced major enhancements of the PFS line for selected MS-DOS computers. Features have been added such as right justification for *PFS:WRITE* and on-screen calculating for a COM network running PC-DOS.

Alpha

Alpha Software Corporation of Burlington, Mass., is demonstrating its recently introduced *Electric Desk* integrated program and an upgraded version of its file manager, *Data Base Manager II—the Integrator*, Version 2.0.

Electric Desk is an integrated

is coming to the forefront in producing this technology, and (this law) will protect U.S. jobs and industry."

However, a House committee report on the bill says the international impact may be limited. "There is no assurance that any other country would agree with the United States that the functional features of a semiconductor chip can be protected under copyright," it says.

package that combines word processing, spreadsheet, database, and communications. It runs on the IBM PC and PC-XT and retails for \$345.

One of the features added to *Data Base Manager II* is Alpha-KEY, a utility program that allows users to speed up and simplify most DBM II functions.

Personal CAD

Personal CAD Systems Inc. of Los Gatos, Calif., is introducing *CADPLAN 1.45*, an enhanced version of its professional CAD software. The updates include the ability to create free-form curves connected by a smooth line, to enter ellipses, to define polygons, and to calculate the area of odd-shaped objects. The database extraction facility has also been improved.

The base price for *CADPLAN 1.45* is \$1,600, including a full-color manual and tutorial.

Lotus

Lotus Development Corporation of Cambridge, Mass., is demonstrating a new product for the Apple Macintosh. The new product is an integrated software package with word processing, spreadsheet, database, graphics, and communications capabilities. It is different than *Symphony* because it is not based on a spreadsheet.

Ashton-Tate

Ashton-Tate, Culver City, Calif., is not announcing any new products at COMDEX but is featuring demonstrations of *dBASE III* and *Framework*. In addition, a press conference on the opening day of COMDEX announced a new ad and marketing theme for Ashton-Tate.

The protection afforded by the Semiconductor Chip Protection Act is similar to that provided by copyright laws. Chip designs need only be registered with the Federal government to be protected; designers are not required to prove that the design is unique, as under patent law.

A spokesman for IBM said the company did not directly support the act and had no comments on its effects.

READ ONLY

A review of the IBM Personal Computer Family, Vol. 1, No. 2



HARDWARE NEWS

Progress. Even for a youngster with unusual potential, the IBM PCjr has made a lot of progress in its first year.

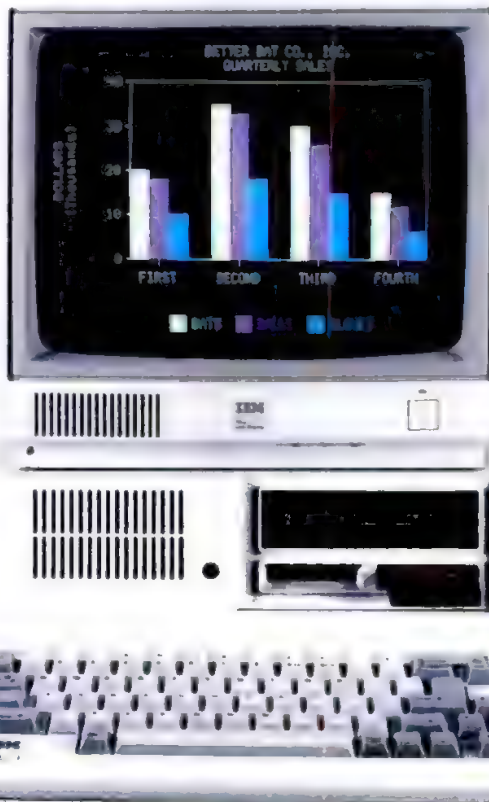
Consider memory for example. The IBM PCjr comes with up to 128KB of internal user memory. You can also add external memory expansion units of 128KB each, up to a total of 512KB. That's far more potential memory than other computers of its price range and weight class (10 pounds).*

Increased memory allows you to take full advantage of the IBM PCjr's powerful 16-bit processor. With up to 512KB of available memory and PCjr's double-sided diskette drive, you can run thousands of best-selling programs that have been developed for the IBM PC. If you're a programmer, the PCjr joins the other members of the IBM PC Family as a full-fledged application development tool.

There is also a variety of plug-in cartridge programs, which work faster than diskettes and don't take up any user memory. Three popular examples are Lotus 1-2-3™, PCjr Color-Paint, and Managing Your Money™ by financial expert Andrew Tobias. And every PCjr comes with cassette BASIC built into the system board.

PCjr makes it easy and affordable to start small and grow at your own

pace. The \$599 PCjr Entry Model, for example, comes with 64KB of memory, runs cartridge programs, and can easily be expanded into a diskette model. The PCjr Enhanced Model at \$999** offers 128KB of memory—enough to run many programs from the IBM PC software library—and a 360KB diskette drive.



Cartridge-based programs for PCjr include Lotus 1-2-3™.

No matter which model you choose, the IBM PCjr's 13 ports for plug-in options make it easy to add to your system, from more memory, to a modem, joysticks (PCjr can accommodate two), color monitor, or other peripherals.

Keys and colors. The IBM PCjr now comes with a new typewriter-style cordless keyboard that frees you to work up close or across the room from the system unit.

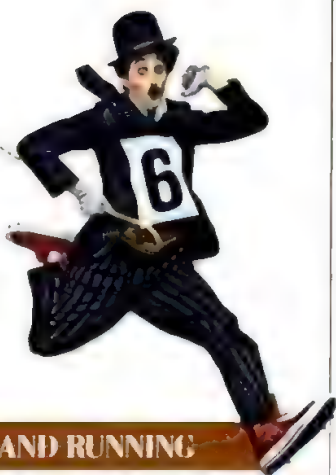
While PCjr can be connected to just about any display, including your TV set, the IBM PCjr Color Display offers some real advantages at a very reasonable price.

It has a built-in speaker and an earphone jack for educational and entertainment programs that feature music and sound effects. The non-glare RGB screen gives you better character definition and clarity than a color composite monitor. And since the PCjr Color Display is designed to be placed on top of the system unit, it's a space-saving addition to your PCjr system.

Whatever monitor you decide to add to your PCjr system, there's no extra expense for an additional interface card. Ports for both monitors and serial printers are built in.

*Weight does not include power pack and monitor.

**Prices shown apply at IBM Product Centers. Lotus 1-2-3 is a trademark of Lotus Development Corporation. Managing Your Money is a trademark of MECA.



UP AND RUNNING

First String. It didn't take the IBM PCjr long to make the team. In its first year of eligibility, PCjr was picked by coach Grant Teaff to play a key position for the Baylor University football team.

Coach Teaff has a practiced eye for players with potential. He's coached the Baylor Bears to two Southwest Conference championships, been named Southwest Conference Coach of the Year five times, and was National Coach of the Year in 1975.

The Bears' coaching staff has used computers to help analyze scouting reports and playing patterns of opposing teams for nearly ten years. In the beginning, though, there was a lot of competition for a limited amount of computer time.

Coach Teaff and his assistant coaches had to write up all their game and player information and then have it keypunched. After that came a wait for processing time on Baylor University's mainframe computers, time that had to be shared with other departments and the university administration. Analysis of a game often wasn't available until a week after it had been played.

PCjr helped change all that.

Winning Tendencies. Coach Teaff calls the IBM PCjr "the ideal football coaching tool." With up to 512KB of available memory, it's powerful enough to make his staff independent of the University's central computers. And PCjr and the PCjr Color Display are inexpensive and compact enough to be used in offensive and defensive staff meeting rooms.

Using software developed by Coach Teaff, PCjr enables the Bears' coaches to enter information as they view game film of an opposing team and to see results immediately. When play-by-play statistics of several games are compiled and analyzed on PCjr, the coaches are able to identify tendencies of a team in given situations. They're then able to adjust their own game plan accordingly.

When Baylor plays new opponents, for instance, the two teams exchange films of past games. PCjr is used to analyze variables such as down, distance, and type of play. The Baylor coaches enter the game with much the same level of knowledge as if they'd played the new team for years.

The IBM PCjr helps out with other coaching duties as well. Team statistics, information about possible recruits, and numerous

business and financial chores are all part of its workload.

Other coaches around the country had a chance to see the benefits of computerized coaching techniques this summer when members of the Baylor coaching staff demonstrated their programs at the nationwide football and basketball clinics sponsored by The Coaches, Inc.

Coach Teaff points out that a PCjr could make the difference between winning and losing to teams—small high schools, for example—with a limited budget and coaching staff. Using the PCjr, he says, "is like adding two or three men to the staff."

Not bad for a 10-pound, first-year player.



WHAT'S THE PROGRAM?

Maximum Security. Some information belongs under lock and key. But the rapid growth of personal computing and computer networks makes it increasingly difficult to keep it there.

Data Encoder software from IBM can help ensure that sensitive information—personnel and payroll records, for instance—is available only to those with a need to know. It uses the Data Encryption Algorithm developed by IBM—and adopted as a U.S. Government Standard—to encode and decode IBM Personal Computer data files and programs.

You don't have to be a master cryptographer to use Data Encoder. For members of the IBM Personal Computer Family with 192KB of memory, there's a full screen interface with menus and help screens. Systems with 128KB use easy

PCjr is a team player for Coach Grant Teaff.



DOS-like commands. You designate the key that triggers encoding and decoding procedures.

Files protected by Data Encoder can still be sent through IBM Personal Communications Manager or any other communications program with a text transparency feature. Without Data Encoder software and the proper security key, however, the information remains unintelligible.

So much for prying eyes.

In the clear. While some people are determined to keep things confidential, others want nothing less than perfect clarity. The following new members of IBM's growing family of programming productivity tools can help remove that unwanted element of mystery from your application programs.

The IBM Professional Debug Facility can help make short work of improving your assembler language programs. It includes a Resident Debug Tool for full function, full screen interactive debugging, a Disk Repair Program, and a Non-maskable Interrupt card for access to a system that's locked because of program error.

The IBM Personal Computer Application Display Management System (ADMS) simplifies creation of clear, informative screens for application programs. Since screen development is one of the most time-consuming programming tasks, ADMS can help dramatically increase your application development efficiency and productivity.

ADMS consists of two parts. The Application Display Designer is a screen building program that significantly reduces the program coding required for an application. The Application Display Manager is a run-time program that interprets the screen design code.

Screens defined with ADMS remain independent of the application program, so they can be modified or redefined without affecting the logic of the application.

The view from the top. It's worth noting that programs developed with the help of ADMS can run under TopView, IBM's new multitasking operating environment.

TopView's multitasking capabilities allow you to work quickly and efficiently with a wide range of application programs. You can switch rapidly from one program to another without reloading diskettes and can copy information from one application to another. Sales figures from a spreadsheet program and a document from a word processing program, for example, can be used concurrently to produce a sales report combining financial information and text.

In addition, the TopView operating environment supports advanced windowing facilities, data transfer among different applications, and pointing devices such as a mouse. All are features that enable you to work easily with a variety of applications.

Data Encoder software from IBM.

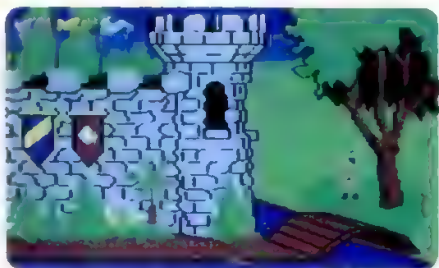
There's also an IBM TopView Programmer's Toolkit available that contains the routines, utilities, and systems related information necessary to develop applications that run under TopView.



Medieval adventures. The ideal game is easier to define than to find: it should be entertaining *and* enlightening. There are new programs from IBM that manage wonderfully to be both.

King's Quest from IBM, for example, is chiefly for fun but does impart a few important lessons. The hero of this colorful three-dimensional adventure game, the valiant Sir Grahame, is sent by the King of Daven-

try to search the countryside for three magical items that will prevent the



King's Quest software from IBM.

kingdom's collapse. Along the way, he encounters dangerous creatures, makes new friends, and avoids—or tries to avoid—treacherous terrain.

King's Quest is unusually enjoyable because you interactively control Sir Grahame's wanderings, helping him duck, jump, or swim his way through the quest. Many tasks can be solved in different ways, and more creative solutions are awarded higher scores.

Hence also the educational value. Cleverness and imagination are rewarded. And a few valuable practical lessons are reinforced along the way. Looking, for instance, before one leaps into alligator-filled moats and deep, dark holes.

King's Quest runs on the IBM PCjr and makes good use of some special PCjr capabilities. Sir Grahame's movements, for example, are unusually smooth and realistic because multiple video buffers in main memory are used instead of a single chip to create the animation effects. PCjr's three voice sound creates an impressive variety of sound effects, such as a fanfare of horns when the castle door opens. And PCjr's ability to produce 16 colors lends a touch of realism to an imaginary kingdom.

Modern machines. But can a program with more serious didactic intent be as enticing as Sir Grahame's rough and tumble lessons? Yes, if it's Rocky's Boots™, winner of *Learning* magazine's Software of the Year award and of high praise from *The New York Times*.

In fact, Rocky's Boots from IBM is also a quest for creative solutions to a series of different games. Along the way, both children and adults can learn the basics of electronic circuitry and of the Boolean logic that drives computer operations.



FUN AND GAMES

Lest that sound too intimidating, remember that the learning is a by-product of games in which you build various simulated machines on your display screen. Early sections of Rocky's Boots guide you through basic instructions about building and activating simple electronic devices.

You're also introduced to the various "spare parts" and "tools"—such as clackers, boppers, alligators, and alligator detectors—that may come in handy. Later in the program there are more challenging games to play using the machines you've built.

All in all, Rocky's Boots is as thoroughly engrossing as King's Quest. And on one point, at least, it's easier: Sir Grahame has to make do without an alligator detector.

Christmas cheer. Rocky's Boots and King's Quest are part of a special Christmas collection of entertainment and educational software from IBM.

Some others in the Christmas collection come from the same series of IBM learning games as Rocky's Boots. They include Bumble Games™, Bumble Plot™, Gertrude's Puzzles™, Gertrude's Secrets™, and Juggles' Butterfly™. See your authorized IBM Personal Computer dealer, IBM Software dealer, or IBM Product Center for complete details.

The Learning Company reserves all rights in the Juggles, Bumble, Gertrude, and Rocky characters and their names as a trademark and under copyright law. Bumble Games, Bumble Plot, Gertrude's Puzzles, Gertrude's Secrets, Juggles' Butterfly, Rocky's Boots, and The Learning Company are trademarks of The Learning Company.

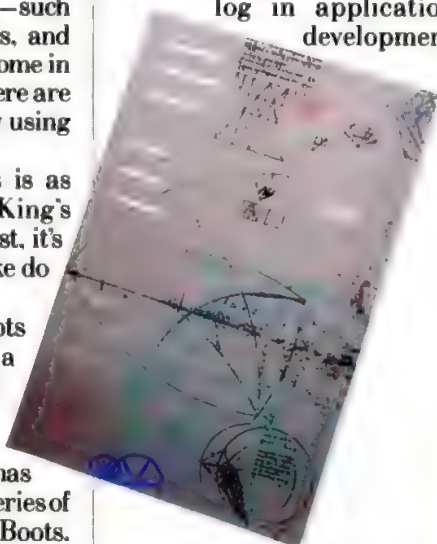


Full Disclosure. If business applications or entertainment programs aren't what you're after, there's a new software listing available from IBM, one with a long title but a specific purpose: the directory of *Engineering and Scientific Programs for IBM Personal Computers Available from Non-IBM Sources*.*

It lists programs in a wide variety of engineering/scientific categories, from Computer Graphics to Lab Auto-

mation and Statistical Techniques. The *Engineering and Scientific* directory includes program descriptions, minimum configuration requirements, initial availability dates, and vendor information.

If your department or laboratory is suffering a backlog in application development



Directory of engineering and scientific programs for IBM Personal Computers.

work, one of these programs—in original form or with a little modification—may be the answer.

For information about where to get the *IBM Engineering and Scientific* directory, see the box at the end of this issue of *Read Only*.

*IBM has not evaluated these programs and makes no comment, warranty, or guarantee as to their functions, quality, or performance.

IBM®



TIPS AND TECHNIQUES

Living Dangerously. Diskettes lead dangerous lives. When they're not being folded, stapled, or otherwise rendered unfit for service, you might think they could at least spend a quiet evening in front of the TV set.

But no. Danger lurks there, too. All color TV sets and many color monitors have a degaussing coil around the face of the tube that demagnetizes the shadow mask inside the tube when the set is turned on.

If you keep your diskettes anywhere near (within a foot or so) the front of your color monitor or TV set, they may be exposed to a large shot of AC magnetic field every time you turn on the power. This could have a fatal and irreversible effect upon the data stored on the diskettes.

Don't degauss your diskettes.



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For more information about IBM Personal Computer products discussed in this issue of *Read Only*, see your authorized IBM Personal Computer dealer or IBM Product Center. To learn where, call 800-447-4700. In Alaska and Hawaii, 800-447-4890.

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PRODUCT REVIEW

Powerful Micro Package Rivals Mainframe ISPFs

EZ-VU's versatile and easy-to-use utilities can save programmers hours of work.

BY TOM BADGETT

EZ-VU Development Facility EZ-VU Runtime Facility

IBM Corporation
PO Box 1328
Boca Raton, FL 33432
(800) 447-4700

List Price: \$130 for *Development Facility*; \$55 for *Runtime Facility*. **Requires:** 192K RAM, one double-sided disk drive.

Producing quality programming for any environment, in any language, is a difficult task. For years, mainframe programmers have used development utilities to ease the drudgery of screen design, input error checking, and program testing. Now, IBM has released *EZ-VU*, an interactive system productivity facility (ISPF) for microcomputers. This software package rivals mainframe ISPF packages in power and utility.

EZ-VU is three utilities in one: A Screen Design Facility, a Dialog Manager, and a Runtime Facility. The screen design and dialog portions are used during program development to design input and output screen displays, establish data variables and types, and set up input error checking. The *Runtime Facility* links these screen "panels" with application programs.

EZ-VU doesn't care which language the application uses. *EZ-VU* supports compiled and interpreted BASIC, Assembler, COBOL, FORTRAN, and Pascal, and the package comes with interfaces for all these languages. Thus, you can design a software package in multiple languages, using the best features of each for different parts of the application.

Screen Design

Using *EZ-VU* is simplicity itself. First you invoke the Screen

Design Facility to establish screen layout. This facility works like a full-screen editor. You can move the cursor anywhere on the screen and type in labels, user prompts, and titles. You can set color or monochrome shading, specify the beginning and end of data input or output fields, and establish error checking for them.

screen areas for emphasis. You can establish background and character colors for any area of the display panel using a "paint" utility for large areas, or you can adjust the color character by character for greater detail.

You can use the Screen Design Facility to produce printed output showing each panel layout and all field attributes. You may also build a "remark" disk file so that the screen descriptions and variable lists are in the proper form to include in your application's source code as program documentation. Utilities to build the remark file are provided for all supported languages.

Dialog and Runtime

After designing the input and output panels, you must "link" them with the application pro-

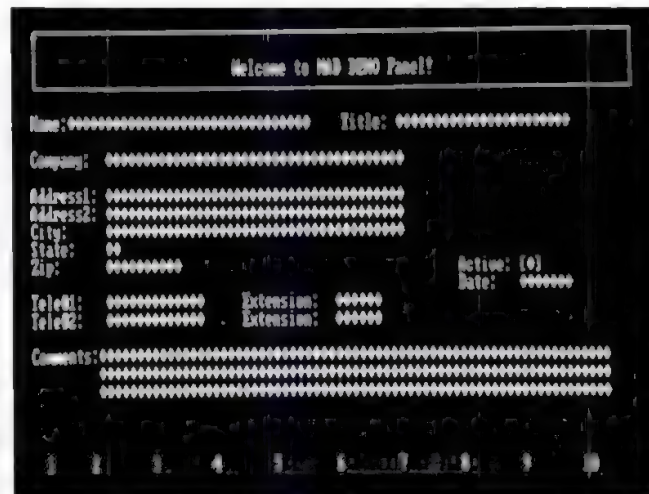
display, input and output, and error checking are done outside the application.

EZ-VU's Dialog Manager also provides an interface between DOS and application programs. When the "run service" feature is called up from within an application, the result is the same as if the request were given at the DOS system prompt. Error-handling services and user prompts help find the requested application if it isn't in the current directory.

During panel and dialog development, all files being accessed must reside together in the current directory. Once the application is established, however, the DOS environment and PATH facilities may be used.

The screen display for panel development is well designed, with color and highlights for easy selection. Ample use is made of the PC's function keys, and an artful arrangement of hierarchical menus allows the program to present selections only when they are needed. Experienced programmers will appreciate the ease with which they can design creative user screens and check program data for accuracy with *EZ-VU*. Beginning or occasional programmers will thrive on the increased productivity that results from being freed from necessary—but often difficult—screen-design and data-checking tasks. And, because you can build "standard" panels and field descriptions, productivity should increase even more.

EZ-VU works in IBM's *Top-view* multitasking programming environment, and obviously is designed for up-and-coming applications development. I found the package easy to learn and use. Indeed, considering its price-performance ratio, it is hard to imagine any program developer working without it. The only drawback is that the *Runtime Facility* must accompany all software written with *EZ-VU*. But the time it saves during program development makes the *Runtime's* \$55 additional cost seem minimal. IBM's interactive system programming facility appears to be a big step in a very good direction. ■



A typical Name and Address (NAD) panel with error checking and user feedback takes only a few minutes to create with *EZ-VU*.

The Screen Design Facility will build a table of acceptable data for each input field, and the Dialog Manager will compare user input with this table before accepting the data as valid. Data translation on a field-by-field basis is possible so that input from the keyboard or data file in the form of short abbreviations or numbers will be displayed in its complete form. Department codes, payroll types, or product information could be entered and stored as one digit, for example, but the complete field data would be displayed during input or output operations.

The Screen Design Facility will draw colored boxes around

program. A number of separate utilities are provided to facilitate data transfer between the application and the panels. Subroutines for each of the supported languages are included in the *EZ-VU* package. One of these subroutines must be installed in each program that will run in the *EZ-VU* environment. You can't tie existing applications to SDF panels without significant changes to the programs.

A test facility helps you check input and error-handling routines independently from the application programs. And less code should be required for each program, because screen

Hardware At COMDEX: Peripherals Dominate

BY CHARLES BERMANT

LAS VEGAS, Nev.—In a year in which IBM has already changed the face of personal computing by introducing the AT, the hardware offerings at COMDEX generally fall more in the realm of peripherals. Storage peripherals, disk drives, and modems are being showcased as the industry continues to move closer to realizing the electronic office of the future.

Sysgen Incorporated

Sysgen Incorporated, of Santa Clara, Calif., is introducing a 45-megabyte cartridge tape backup subsystem, QIC-FILE. Priced at \$1,395 for an internal version and \$1,495 for an external model, it uses quarter-inch cartridges and restores data at 4 MB per minute.

The cartridge tape backup is being introduced in conjunction with a stand alone Winchester Disk Drive and an expansion box with hard disk. The DISC FILE, slated for a \$2,995 list price and a January 1985 availability, is self-booting, eliminating the need to use a floppy disk to access hard disk data. The expansion unit, the DISK I/O, runs at \$1,995 and includes six expansion slots in addition to an 18-MB formatted hard disk.

Alloy Computer Products

Alloy Computer Products, of Framingham, Mass., is entering the backup race with PC QIC-STORE, which contains both a hard disk and streaming tape backup unit. Sized to fit under a PC, it claims a tape backup speed of 2 MB per minute. It requires the use of one expansion slot and ranges from \$4,595 to \$11,295, depending on the hard disk capacity desired.

Tallgrass Technology

Tallgrass Technology, of Overland Park, Kansas, has re-

vamped its TG-4060 cartridge tape management system for use on the IBM PC AT. This \$1,995 add-on allows up to 55 megabytes of error-protected data to be recorded on a quarter-inch cartridge. In a statement indicative of the rapidly expanding state of storage, a Tallgrass spokesperson said that its TG-3012 hard disk/cartridge backup system will soon be deleted because "12 megabytes isn't such a big deal anymore."

Ampex

Ampex, of El Segundo, Calif., is aiming for unique addressability and speed with PC Megastore, a Winchester disk drive with an optional streaming tape backup. The tape is able to backup a 10-megabyte disk in 90 seconds. The cache memory is able to look ahead, and programs can be directly booted off the tape. The prices without the tape: 10 megabyte, \$1995; 20 megabyte \$2395. With tape, the units cost \$4295 and \$4995, respectively.

Ampex is also going after the dumb-terminal market with its \$649 Model 230, a 132-position, ergonomically designed

station, with programmable numeric keypad, and available with an amber or green screen.

Adaptec Inc.

Adaptec Inc., of Milpitas, Calif., is striving to put some sense and organization into the mass-storage concept. It is introducing a 10-megabit-per-second 2/7 run-length limited version of its encoding/decoding chip, along with a controlling board using the same encoding/decoding scheme.

These add-ons, quantity priced at \$23.50 for the chip and \$280 for the board, are designed to help systems designers easily configure high-capacity storage systems.

AST Research

AST Research, of Irvine, Calif., is bringing forth the ADVANTAGE! multifunction expansion board for the PC AT, not to be confused with the ADVANTAGE multiuser board introduced by Computone in September. The AST product adds up to 3 megabytes of RAM, and up to one parallel printer port, two serial ports, and a game port. Prices for this peripheral start at \$495.

Hayes

Modem companies will take the opportunity of this year's COMDEX to speed up and secure computer communications. Hayes, of Atlanta, which set the standards for the modem industry, is presenting the

Smartmodem 2400, which shares most of the features of its previous 1200- and 300-baud models.

The new modem has capabilities to monitor call progress, distinguish busy signals, dial tones, and no answers.

A Hayes spokesperson said transmission errors will be reduced with an equalizer. Older phone lines have often been unable to accurately transmit digital data, and "with satellites, they bounce around the heavens so many times that there is a lot of garbage. The problem hasn't been sending it fast, but accurately."

Hayes had not yet decided how much to charge for the Model 2400; there was some concern that a lower price would "blow the 1200 out of the water." And, while databanks such as The Source are expected to be able to accommodate 2400 baud, Hayes does not expect the super-fast modem to catch on with home users.

U.S. Robotics

While the Hayes is almost physically identical to its other models, U.S. Robotics is using a more modern design for its 2400-baud modem, the \$895 Courier. Available in an internal and external version, it shares many of the characteristics of the Hayes. The Courier is expected to be introduced in February.

Cermetek

Cermetek Microelectronics, of Sunnyvale, Calif., will not be introducing a 2400 baud modem this year. Instead, they have opted for higher security at a lower baud rate. Their Security Modem, which sells for \$695, requires both a password and verifiable callback number for access, making a break-in to a host computer "virtually impossible." Callback verification can be automatically achieved on a second line, and the modem keeps an audit trail that lists all authorized and unauthorized access attempts.

Tecmar

Tecmar, of Cleveland, Ohio, is pushing its Graphics Tender, a
(continued on page 56)

The Sounds of Software

One of Lotus's competitors may have taken *Symphony's* name too literally.

Xanaro Technologies Inc., of Toronto, Ontario, has introduced *Ability*, a new multifunction software package that, like *Symphony*, combines word processing, spreadsheet, database, graphics, and telecommunications applications.

In addition, Xanaro's product lets you make "snapshots" of its screens and arrange them into a slide-show style presentation—enhanced by musical accompaniment from *Ability's* repertoire of 25 preprogrammed tunes, including "Taps," "Hail to the Chief," "Jingle Bells," the "1812 Overture," and several other fanfares.

Despite its name, *Symphony* is mute. To compete, Lotus could add a musical module with "We're in the Money," "Hey! Big Spender," and "Gloomy Sunday." Or perhaps Lotus could include a program of transcendental chants by Mitch Kapor's old boss, Maharishi Mahesh Yogi.

—James Langdell



I fell 20,000 feet and lived.

There I was flying Microsoft® Flight Simulator over Chicago's O'Hare Airport, having the time of my life. Suddenly my carburetor started icing. My RPMs started falling. My altimeter spun backwards. The Sears Tower loomed ahead.

I was behind the controls of a Cessna 182. As an experienced Microsoft pilot, I had taken off and landed at 80 different airports. Created different flying challenges (using my Microsoft Mouse and my joysticks). Altered the weather, time and season. Even flown the World War I dogfight mode and successfully battled enemy aircraft.

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PC and PCjr like Microsoft. Because Microsoft's MS-DOS™ operating system tells them how to think. And Microsoft BASIC is the language spoken by nine out of ten microcomputers worldwide.

The next time I flew they had repaired the Sears Tower. My next stop? The World Trade Center.

Sound fun? Then fly Microsoft. Call (800) 426-9400 for the name of your nearest Microsoft dealer. In Washington State, Alaska, Hawaii and Canada (206) 828-8088.

MICROSOFT.
The High Performance Software

Hardware (continued from page 54) \$299 color board with a parallel port, offering high-quality, medium-resolution graphics capability. This represents the trend toward saving slots, as printer control can be achieved at the same time.

TeleVideo

TeleVideo, of Sunnyvale, Calif., is striving toward multi-user friendliness with its Personal Mini, offering a central computer with a powerful, resource-sharing operating system. IBM-PCs, XTs, and compatibles can be used as workstations.

The heart of the Personal Mini is the PM/4T. Based on the Intel 80186 and Zilog Z-80 microprocessors, it manages all systems activity with its 20-megabyte Winchester, a floppy drive, and a tape cassette drive. It supports serial and parallel printers along with a system console.

Epson America

Epson America, of Torrance, Calif., will be banking on its QX-16. Although it costs twice as much as the Chameleon or most Kaypro models, the MS-DOS, CP/M-compatible PC is borrowing a leaf from that marketing book: it is bundled with *Valdocs 2* software, an integrated package with a spreadsheet, business graphics, word processing, address book, electronic mail, and scheduler modules. Epson expects to price the package at under \$3,000 and says it will be available in 1985.

Datacopy

The upcoming year will find a growth in hardware dedicated to optical character recognition—the ability to input printed data into a computer. Datacopy, of Palo Alto, Calif., is uncovering its Model 700, a less-than-\$4,000 imaging device that closely resembles, in its design and “look,” a small office copier.

Unlike Datacopy's previous camera-based models, the Model 700 is based on a flatbed scanner. It includes software and full PC interface and is scheduled to be available to the public in early 1985. The ma-

chine is programmed to receive common pica and elite fonts but can be “taught” to recognize other typefaces.

Orchid Technology

Orchid Technology, of Milpitas, Calif., who manufactures the PC-Turbo board, plans to introduce *Power Tools*, a software package that gives some of their popular enhancements of the Turbo to users who do not own the hardware. Priced at \$145, it includes *Disk Cache*, which keeps track of the most commonly accessed sectors on the disk; a program that organizes the hard disk and allows it to be sectorized without needing a separate DOS for each partition; and a command spooler, which allows printer queuing, and a RAMdisk package. Orchid says the combination can in-

crease the speed of any PC-compatible and will be available in December.

New Orchid hardware includes PC-NET 3.0 for the AT, and Turbo VM, which includes an enhanced operating system that allows concurrent processing of two programs in the same computer—one on the 286 and one on the 186 boards. This allows simultaneous communications and processing of information.

Micro Display

Micro Display, of Hastings, Minn., will introduce the Genius VHR, a high-resolution portrait mount monochrome monitor. The Genius VHR will be available in three screen colors. Shaped vertically and designed as a replica of an 8-by-11-inch piece of paper, it includes

an adapter card with a parallel port, replacing the need for any display adapter card.

It has a switchable 25- and 66-line mode, along with the ability to switch to a high-resolution 100-dots-per-inch mode. The bit map mode can handle the simultaneous projection of text and graphics to one screen, eliminating the need for two separate monitors. The new genius will retail for \$1,150; it costs \$1,495 with bit map mode.

Mouse Systems

Mouse Systems, of Santa Clara, Calif., is introducing a new 16-color version of its *PC-Paint* program, usable automatically on the PCjr or in conjunction with an STD color graphics card for the PC, XT, or AT. Available for \$220 bundled with a mouse or for \$99 by itself, the program offers over 100 different color blends.

Shugart

Shugart, of Sunnyvale, Calif., is demonstrating its recently announced 724 5¼-inch Winchester drive as an expansion to its existing family of 5¼-inch Winchesters. The 724 stores 20 megabytes of data and is aimed primarily at the OEM market for desktop computers. It retails for under \$500.

Teac

Teac Corporation of America, of Montebello, Calif., is announcing two new disk drive products. The FD53 series of lower half-high 5½-inch floppy disk drives, which are a lower cost version of the FD55 series, and the FD135 series of 1-inch-high, 3.5-inch floppy disk drives.

Teac is also emphasizing its FD55 series of floppies, the SD10 10-megabyte ½-inch-high Winchester, and the MT2ST 20-megabyte streaming cassette tape drive.

Microscience

Microscience, of Mountain View, Calif., is emphasizing two products introduced at the National Computer Conference show, the HH725, a 20-megabyte 5½-inch Winchester disk drive, and the HH32, a 3½-inch 10-megabyte Winchester. ■

A DOS Scoop?

The software bundled with the Silver Fox Computer (a dirt-cheap Sanyo workalike) includes an enhancement for MS-DOS. Silver Fox's 800K disk drives read any storage format used on PCs. The most impressive part is the program's name—HAGEN-DOS.

“We're ice cream freaks here,” explains Tom Scott, a Silver Fox salesman. “But to justify HAGEN-DOS, we decided that it was an abbreviation for HALF-track GENERating Disk Operating System.”

For more on HAGEN-DOS, dial (800) FOR-A-FOX or write to Silver Fox Computers, 617 N. Scottsdale Road #8, Scottsdale, AZ 85257.

—James Langdell

Divided They Stand

After a year of suits and countersuits, VisiCorp and Software Arts settled out of court on the rights to *VisiCalc*. The spreadsheet program will now be sold exclusively by Software Arts, developer of the program marketed by VisiCorp since 1979. (See “\$99 VisiCalc—A Cheap Shot in Spreadsheet Split,” PC, Volume 3, Number 8, page 34.)

One of the points disputed by the two companies was the legal status of *VisiCalc*'s name. If this dispute had occurred in biblical times, King Solomon might have settled matters by splitting the name in two and giving each company half—*Visi* to VisiCorp and *Calc* to Software Arts.

The settlement was Solomon-like in that Software Arts will be the only company selling products called *VisiCalc*. Visicorp can keep its Visi-fied corporate name and use *Visi* in other product names such as *Visi On* and *VisiWord*. But the *Calc* suffix is another matter. As part of the agreement, *Visi On Calc*, the spreadsheet module of *Visi On*, will be renamed *Visi On Plan*. VisiCorp's *Flashcalc* (available for the Apple II series), however, will be allowed to keep its name.

Ok, guys. Now that you've straightened out the names, get out there and make some software that lives up to the *VisiCalc* legend.

—James Langdell

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CIRCLE 370 ON READER SERVICE CARD

FIRST LOOK

Program Sets Stage for Personal Decision Series

BY ALFRED POOR

Data Edition is just one part of the new IBM family of productivity packages, called the "IBM Personal Decision Series," or PDS. It combines file management functions with communications, allowing you to transfer data as well as organize and print it. *Data Edition*, priced at \$250, is the first building block in the PDS family; it is designed to form the foundation for a full range of programs that will work together and is a requirement for all other PDS applications.

Among the main PDS functions, *Words Edition* provides word processing features; *Plans Edition* does spreadsheets; and *Graph Edition* and *Report Edition* are just what they sound like. Other parts cover other productivity functions such as calendars, and each unit is priced between \$150 and \$300.

Even a quick glance suggests that *Data Edition* is a substantial entry in the database management field. Though it deals only with "flat" files, it does so with impressive sophistication. A flat file is one that handles only one type of record at a time, such as a file card or "Rolodex" record. (It would be grouped with the Category 1 programs in *PC Magazine's* "Project: Database," which started in Volume 3 Number 11.)

Full-Featured

A variety of sophisticated features set *Data Edition* apart from other programs in its class. You can specify edit masks for data entry, or provide a short list of acceptable responses that can be used to verify the validity of an entry. Report formats can include fields that are calculated "on the fly" as the report is printed.

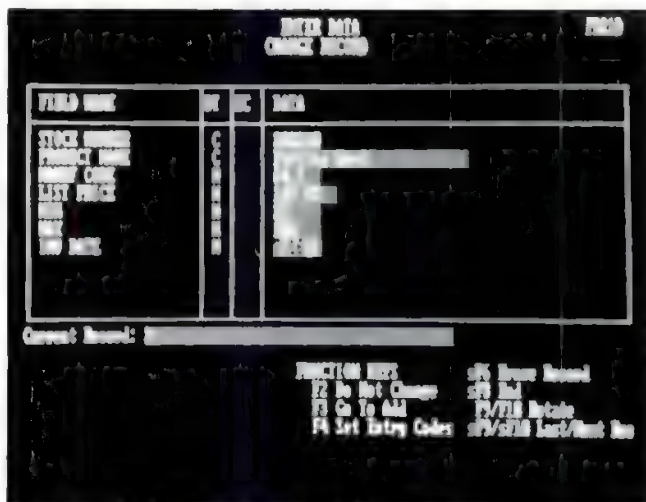
Plenty of options exist for

search-and-select procedures, both for updating and reporting data. You can specify up to seven indexes per file (although you may use only a single field per index) and even run a BASIC program while you're

names will appear, one after the other, in the blank.

Varying Standards

On the other hand, IBM has not quite succeeded in its claim of "standardized function



Above, a sample of the options that exist with *Data Edition*.

within *Data Edition*. On top of all this, *Data Edition* has a communications module that permits asynchronous file transfers with other PCs or even mainframes.

One of the program's greatest strengths is the value it gives you for your dollar. At \$250, it is priced below most of the more complex and difficult database packages. It provides many features not found on other programs at almost any price.

Data Edition relies on many screens that are a combination of menus and "fill in the blanks." Lest this become tiresome, IBM has provided a nice touch: The F9 and F10 keys allow you to "rotate" through all the valid responses for many of the fill-in options. For example, when asked for the name of the file you wish to work with, press F10 and the available

keys." While it is true that most keys perform the same way in most circumstances, there are annoying exceptions. For instance, F8 usually signals that you are finished with an operation, while Shift-F8 is used to cancel or abort. Unfortunately, there are times when Shift-F8, not F8, is the exit key, and I found myself cancelling some operations when I just meant to finish them.

There is a long (200-page) tutorial section, followed by a 270-page reference section. The writing is clear, and dot matrix renditions of screen displays and sample printouts are used widely. However, there are two problems with the manual: First, it is too long, consisting of about 700 pages in all, including nine appendixes, a glossary, and detailed error messages. Second, it is disorganized. This

book deserves the Technical Writing "GOTO" Award. The glossary is not a straightforward listing of the jargon used in the manual, but includes lengthy explanations of many procedures. As a result, you might read in the tutorial that to learn more about a certain step you should turn to the reference section. There you may find a short explanation with a note sending you on to the glossary. To make matters worse, the reference section is organized in part alphabetically, and in part by major function. This forces you to rely on the index if you want to find a given topic with any speed.

One more observation, without comment: In a style reminiscent of the good old Radio Shack Model 1 manuals, cartoons of an anthropomorphic computer grace the margins of the *Data Edition* manual.

Manual Labors

On the whole, *Data Edition* is easy to learn and fast to operate, although it may take some effort to learn to use the more advanced features. This is to be expected, given the high level of flexibility and range of features included. If you want more help, IBM offers the *PDS Data Training Edition* for \$70, which gives you an interactive tutorial that goes beyond the one provided with *Data Edition*.

Data Edition is available through most IBM distribution points. It can be purchased at authorized dealers and IBM Product Centers, as well as through IBM National Accounts and National Marketing. In an interesting move, IBM has separated support from the purchase of the product: there are different extra-cost options for the different levels of "extended" support, one of which includes telephone access to technical support at a cost of \$40 per call.

PC Magazine will be putting *Data Edition* through its paces for a rigorous and detailed review in the near future. In the meantime, if you are looking for a program that lets you do a great deal with single files, this program at this price is worth a good, hard look.

GenTech

COMPUTERS

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PC w/64K, 1 Drive & Controller	\$1499
256K, 2 Drives	\$1795
256K, 2 Drives, color graphics, printer adapter & PGS HX-12 monitor	\$2549
256K, 1 Drive & 10 MB Hard Disk	\$2899
COLUMBIA	
MPC 4210 / PROFESSIONAL	\$Call
VP 2220 (Portable w/256K)	\$Call
COMPUPRO 10 (40 MB, 7 users)	\$Call



CORONA PC-22 (256K, 2 Drives)	\$Call
Portable PC-22 (256K, MS-DOS 2.0)	\$Call
FUJITSU MICRO 16s (8088/280A)	\$1995
PC-8801A (280A, 64K, 2 Drives, 12" Monitor, WordStar, MailMerge, Multiplan, NBASIC)	\$1149
APC-III With NEC Printer & Software	\$Call
SANYO	
MBC 550-2 (8088, 128K, 1 DSDD Drive (320K), WordStar, CalcStar, EasyWriter)	\$Call
MBC 555-2 (550-2 Plus 1 Add Drive, Mailmerge, Spellstar & Infostar)	\$Call
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SWP Micro Computer Products	
Co-Power-88 Board (8088 w/ 256K, 1 MB)	\$Call
For KAYPRO 2, 4, 10 & MORROW	\$Call
Lotus Patch Now Available	

TELEVIDEO	
1605 (8088, 128K, 2 Drives, DOS 2.0)	\$Call
TPC-II (Portable Version of Above)	\$Call
WAME Systems & Accessories	\$Call
ZENITH Z-150-52 (8088, 2 Dr., 320K RAM)	\$1929
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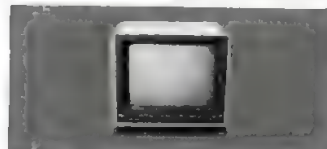
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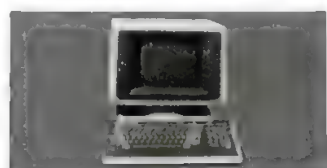
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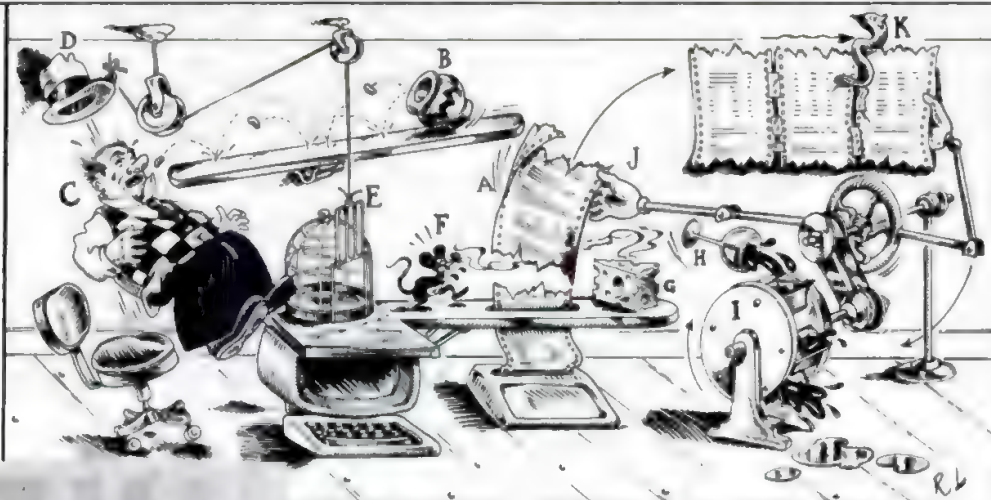
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MOUSE, INSPIRED BY SCENT OF PERFECTLY AGED CAMEMBERT CHEESE, GNAWS THROUGH SPREADSHEET, ONLY TO DISCOVER HE HAS BEEN FOOLED BY AROMA OF OVER-RIPE GORGONZOLA (G).

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CIRCLE 306 ON READER SERVICE CARD



Janus Opens Door To New Diskette Marketing

Company hopes free software will send their floppy disk's sales soaring.

BY DON KENNEDY

Janus Dyc Company, of Milpitas, Calif., has begun shipping boxes of their double-sided, double-density 5¼-inch floppies with a few unusual extras—free programs and coupons that you can use for free or reduced-price software.

A box of ten floppies lists at \$39.95, a price certainly comparable to those of diskettes manufactured by Janus's competitors. Janus hopes to get an edge by including a fully functional PC-Write, a PC-File III database manager, three templates for Lotus's 1-2-3 or Symphony, three templates for dBASE II or Framework, and two interactive games.

Bargain Basics

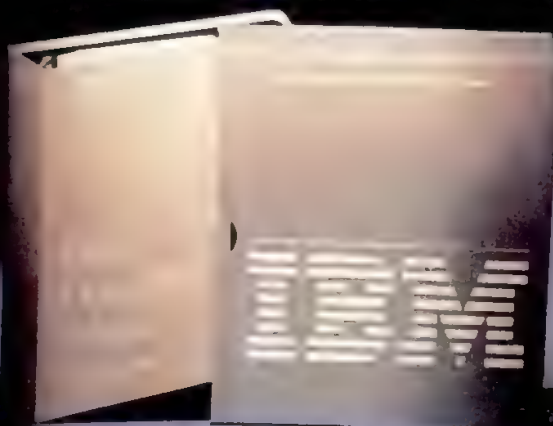
One of the nicest freebies is a database used with PC-File III that includes a listing of every article printed during the first quarter of the year in PC Magazine, PC Tech Journal, and other magazines devoted to the IBM PC. In addition, three



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People in the News: James Schuyler

Designware's acquisition by Peachtree has expanded the educational software developer's reach and its founder's crusade for computing in the classroom.

BY CHARLES BERMANT

SAN FRANCISCO—Dr. James Schuyler, founder of Designware, was on a cross-country promotional tour when he heard some disturbing news. A suit had been filed against MSA/Peachtree, the company that had just acquired Designware and was paying for Schuyler's promotional tour. Sherman Steffin, the founder of Edu-Ware (which had also recently been acquired by Peachtree), charged Peachtree with breach of contract, securities fraud, conspiracy, and violation of agreements.

Despite the unsettling implications, Schuyler said he wasn't fazed and didn't see the suit as a harbinger for his own company. "I can see no grounds for Steffin's suit," he says. "Edu-Ware wasn't doing as well as it could have, but market conditions haven't been that great. Steffin was in charge the whole time he was there."

"We're continuing to run Designware as a separate entity. We've been very pleased so far; the acquisition has been handled in the correct way."

No Change

Designware, purchased by Peachtree in September, will continue to use its current logo, taking advantage of its already considerable brand recognition. Schuyler says the acquisition has been good for both Peachtree and Designware. Since less venture capital is available to support the growth of small software firms such as Designware, these companies need money to stay competitive.

The distribution networks of the two companies are also complementary. Peachtree has direct connections with retail stores, while most of Designware's own sales are to distributors.

Schuyler says the company will maintain research, de-

velopment, and marketing at its current pace. The finance department is the only one that has shrunk.



By purchasing Designware, Peachtree was seeking to complement what it already had. The buy out—in the works for about a year—came at a crucial time. Schuyler doesn't think that any independent software company claiming a profit in 1984 will be telling the truth, but those surviving as independents through 1985 will make it through the long term.

"In 1985 everyone has the opportunity to be profitable," he says. "In a marketplace that's doubling, most people's fixed expenses are too high. In 1985 we can sell twice as many units while keeping fixed expenses the same."

IBM compatibility is important to Designware but it is by no means its lifeblood. A good chunk of its sales are to Apple and Atari, and even if the business and, to a degree, the home market has rejected the viability of the PCjr, the machine is still an important part of Designware's marketing strategy. Earlier this year, the company converted its entire library of programs for use on that machine.

Third-party publishers of Designware programs include SRA, Reader's Digest, and Spinnaker Software. With these other distributors, Designware

has managed to eke out an almost 10 percent share of all institutional educational software product sales. The company has also carried out research projects for Xerox Learning Systems and Sony.

The Kid in Everyone

Designware produces about a dozen programs—mostly educational games that use the computer to reinforce simple facts.

"We drill on points that would otherwise be sheer drudgery," Schuyler says. "We integrate game activity into education. A graphic depiction of the United States, for instance, helps to prompt the child's memory of which state is associated with a particular fact."

The educational games have small databases within the programs, which allow the user to add other miscellaneous facts. In *States and Traits*, for instance, the names of the state flowers or governors can easily be added to a second disk. Other games, like *Spellicopter*, have databases that are less easily exhausted.

"We don't overemphasize computer literacy. The most important thing is the subject matter. Generally, kids are highly motivated to learn and read. Educational programs increase this motivation."

Schuyler feels that not only bright children can benefit from the computer; it should be used more often as a remedial tool. He adds that there can be no serious ill effects from preschool computer use.

"There is a difference between the motor skills required to press a key and those required to grasp a pencil," he says. "If the parents don't pay attention, children brought up only with a computer will lack some motor skill for a while, but will be learning other valuable skills."

Literacy Gap

Much of the research on computer learning, according to Schuyler, has yet to be applied. A large part of it was completed in the late 1960s, at a time when computers were too expensive for every school to get one.

Now computers are commonplace in some schools, but there are others considerably less fortunate. "The gap is troublesome," Schuyler acknowledges. "But that's where the school system comes in. It will make a difference. A computer will augment a teaching staff. It's difficult to buy media when a teacher can spend only \$30 per student annually. The price of computers is coming down, but it won't come within reach of most school budgets for at least 5 years."

"It has to be a matter of public policy before computer education will affect a broader base. A computer can be quite an opportunity. It motivates students. It's a shame that so many kids haven't learned to write because they were trying to survive."

Schuyler feels that as school aid increases, computer educational opportunities will spread across the socioeconomic strata. Also, computer companies that make good deals to schools are making solid business decisions: a child experimenting with a PC could become a lifelong IBM user.

"Every 7 years there is a back-to-basics movement," he says. "When the next one comes, there will be enough microcomputers to go around. Computers have been thought of only as computers. They have gotten to the math curriculum first. It has only been in the past 2 or 3 years that English teachers have thought of using them. It's a matter of teachers understanding their usefulness as a tool."

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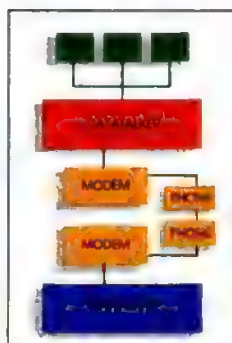
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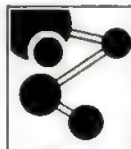
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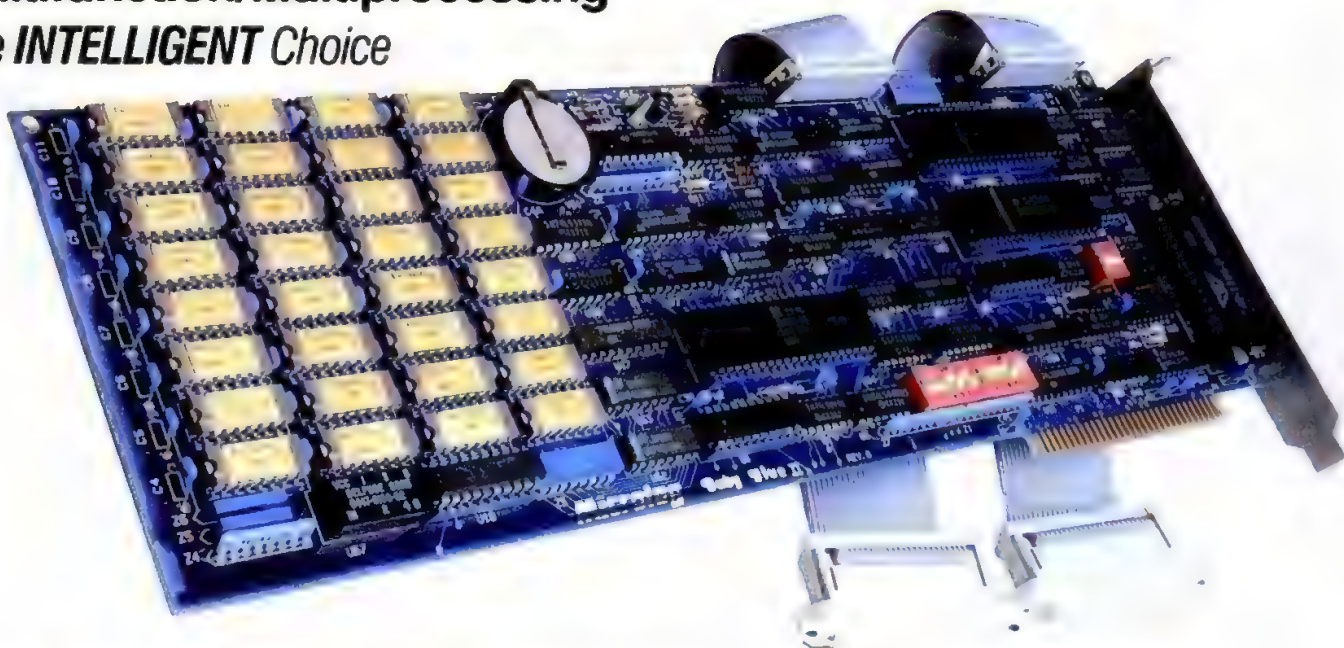
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Systems utilities

PDQ RAMdisk Software: create a FAST pseudo-disk drive of any size in available system RAM. The DOS 2.0 version lets you change the size of your RAMdisk from the keyboard.

Print Buffer/Spooler: a TRUE print spooler: the Z-80 buffers and manages printing independent of your PC. Unlike other so-called "spoolers", this one won't stop your printer or slow you down when you start another job.

Clock Software: sets Baby Blue II's clock and initializes the system clock at boot time—never type the time and date again!

Communications

Smart Terminal Emulator Package (STEP): talk to other microcomputers or connect to larger host computers, as an asynchronous terminal through Baby Blue II's serial ports. Unlike other "smart terminal" programs, STEP offers full emulation of popular video display terminals (the standard package includes Televideo 950 and Hazeltine 1500).

IBM 3101, DEC VT100 and many others are optionally available. You can send or receive text files, and with STEP's unique Sessions Menu, changing your configuration is a keystroke away.

BSTAM File Transfer Utility: Transmit and Receive text, HEX, and binary files (including .COM files) without errors and without fuss. BSTAM is easy to use, with all configuration parameters handled transparently under STEP.

CP/M-80 compatibility

Baby Blue Conversion Software: Microlog's famous CP/M Emulator turns CP/M-80 programs into PC-DOS programs for fast, efficient execution on Baby Blue II. Completely transparent operation using standard PC-DOS commands—freely mix PC-DOS with CP/M programs and text/data files on the same PC-DOS disks.

Convert: supports bidirectional file transfer between PC-DOS and popular CP/M disk formats.

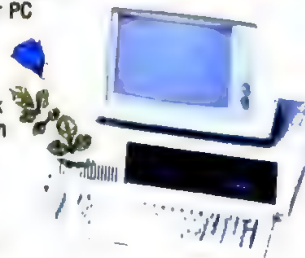
Keyfix: automates your keyboard with 54 programmable function keys for CP/M programs, eliminating tedious typing chores (max. 80 characters per key).

Baby Blue II (64K installed) \$ 695.

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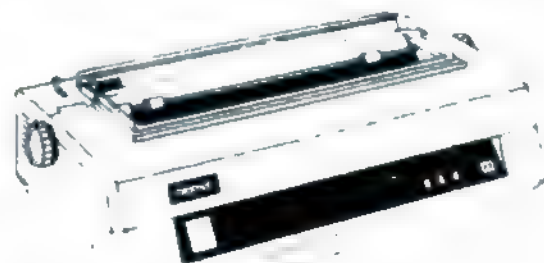
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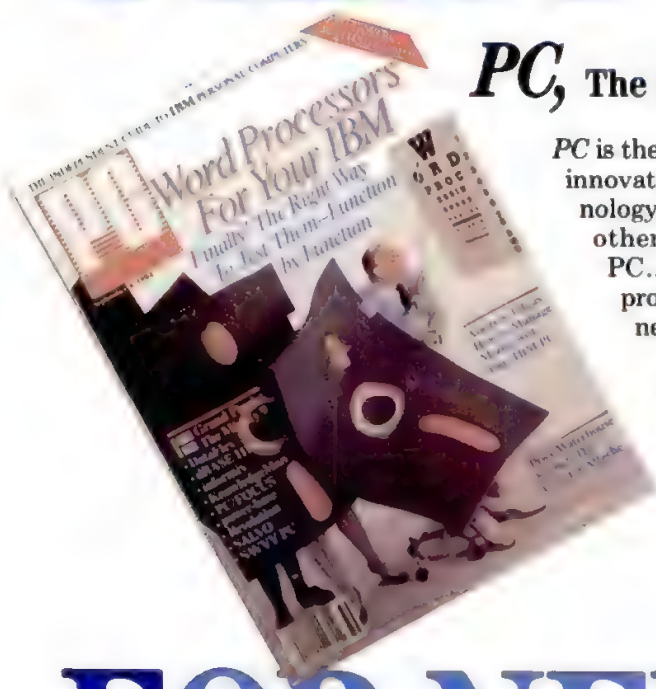
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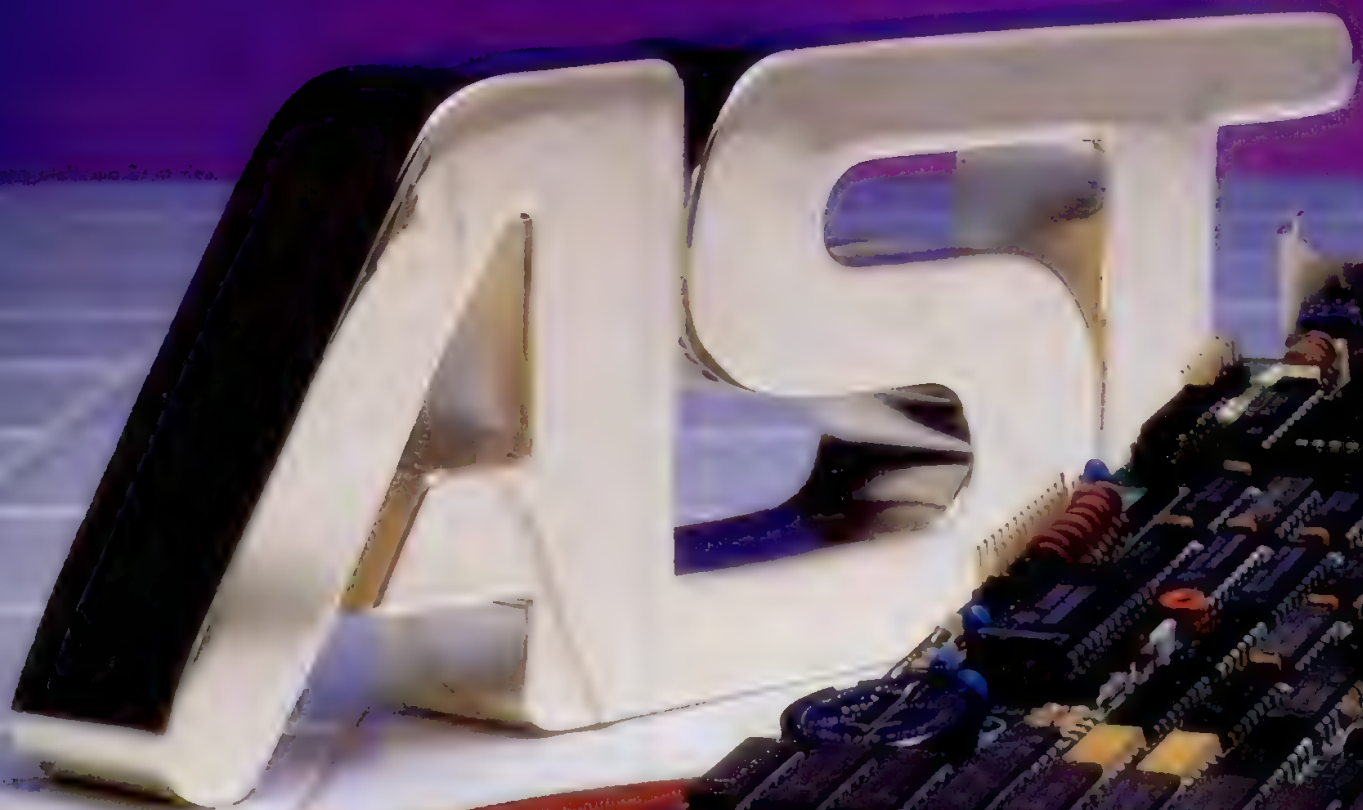
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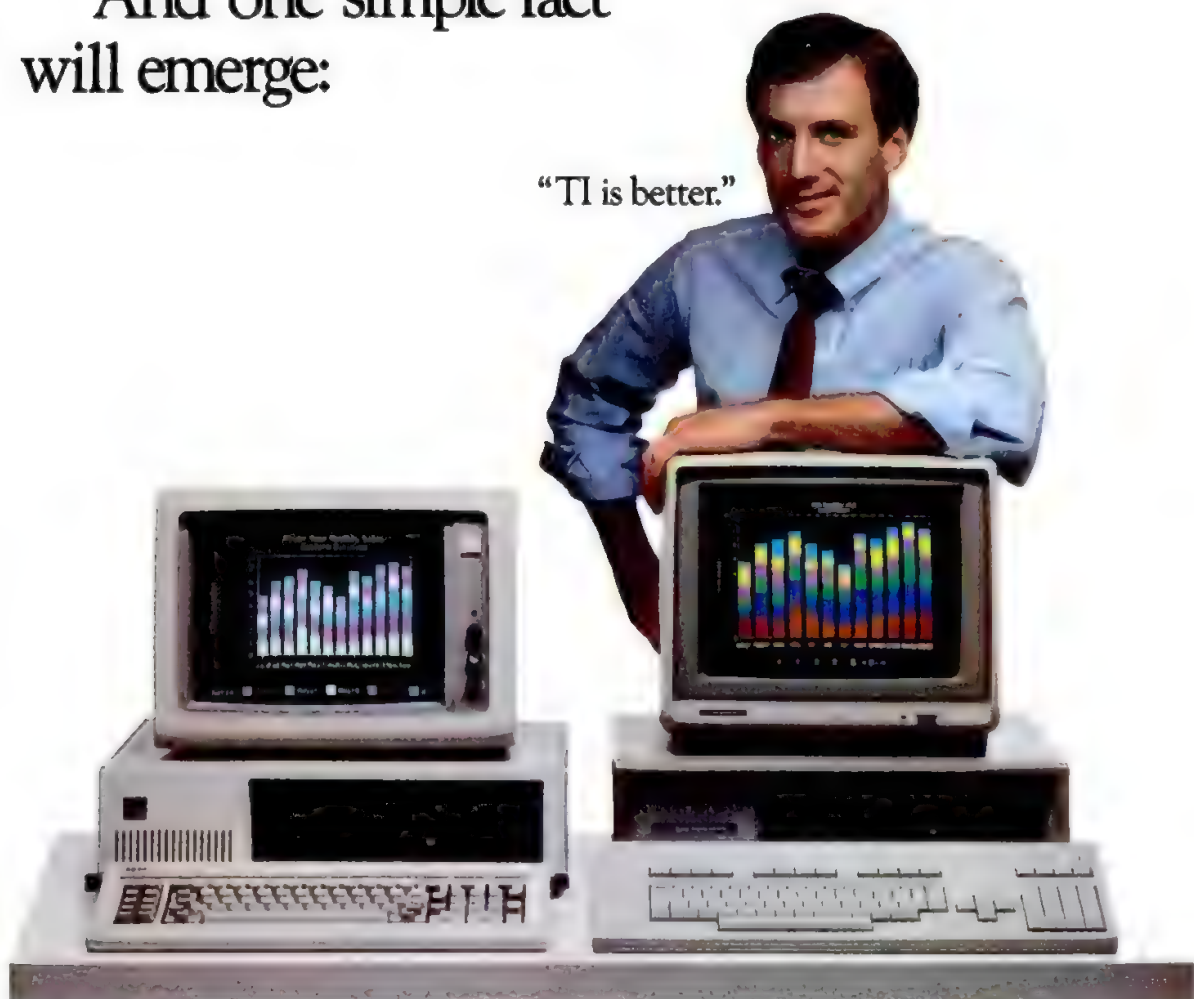
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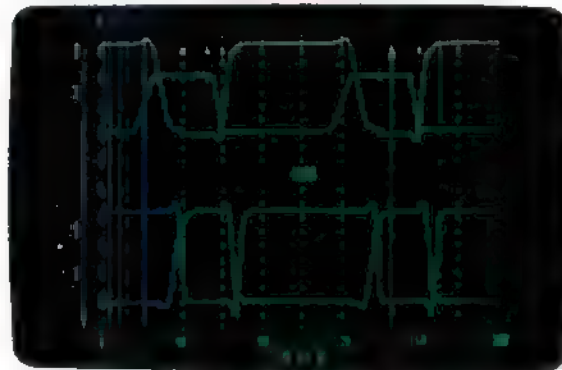
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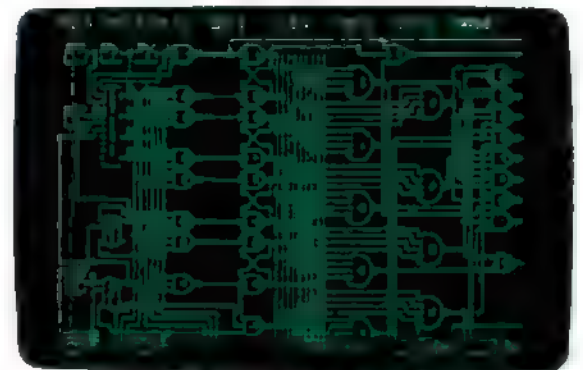


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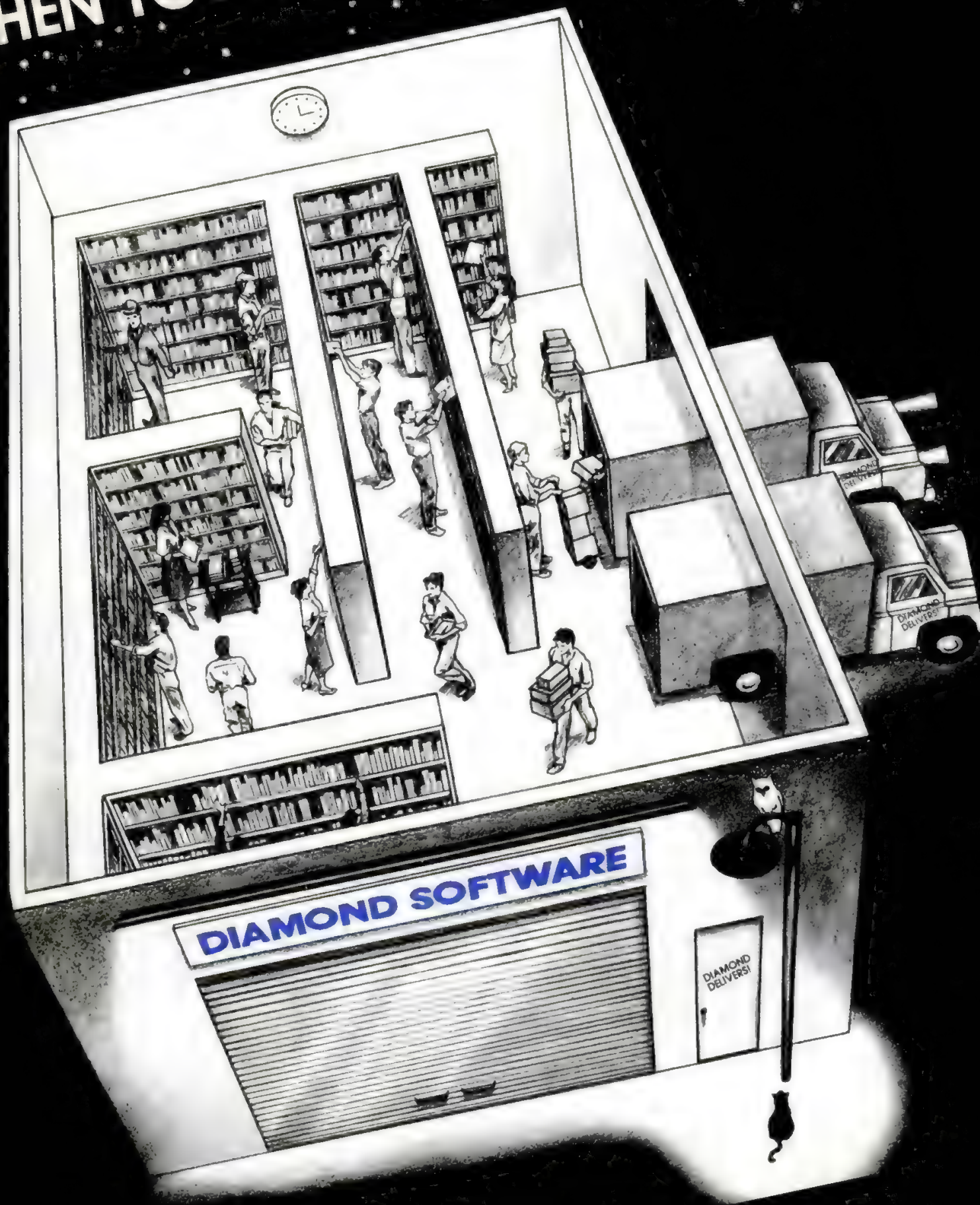
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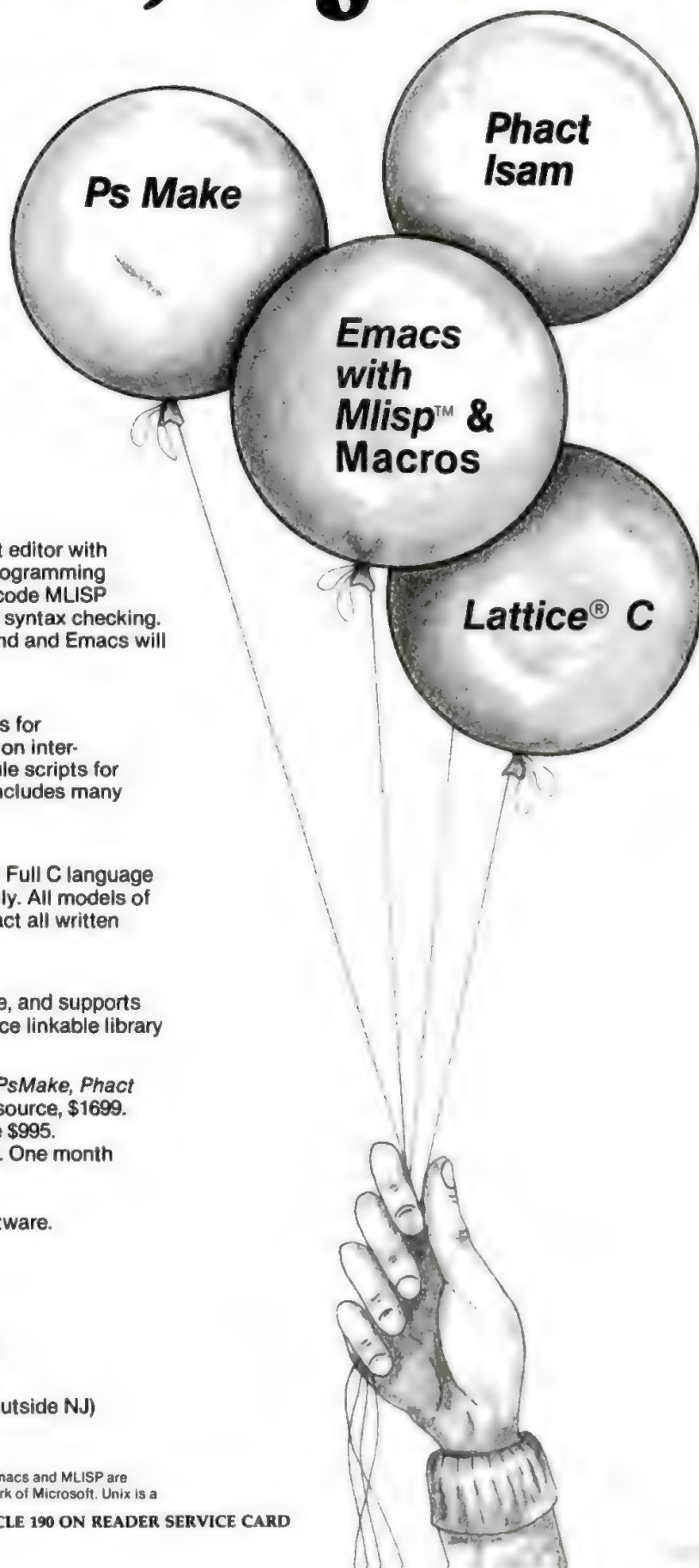
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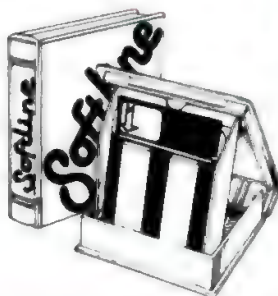
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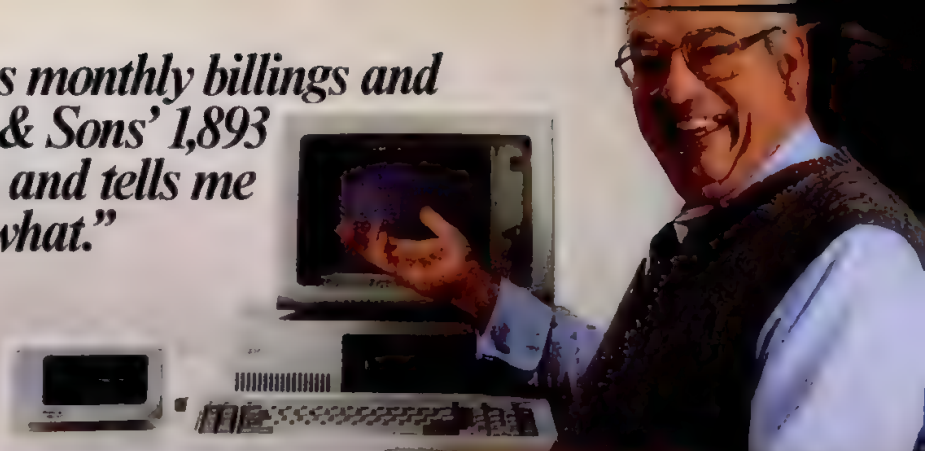
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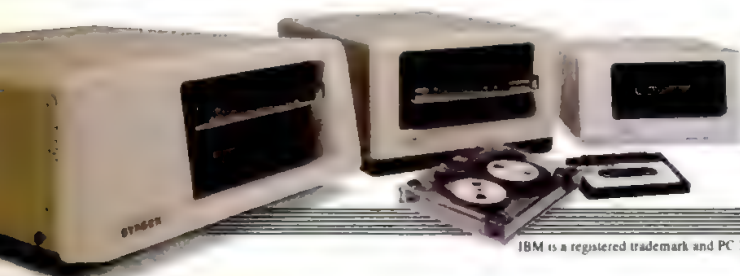
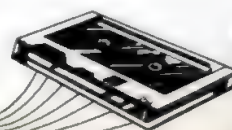
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Selling Iron

IBM has entered the PC software business in a big way, with quality and consistency that is good news for users. But is Big Blue selling software or bigger and better hardware?

IBM's two new in-house-developed software product lines, Personal Decision Series (PDS) and Business Management Series (BMS), are well targeted and poised to dominate their markets. Neither fills a unique gap in the market, but each sets about its tasks in unusual and interesting ways.

PDS's database manager, *Data Edition*, manages only flat files, although it provides multiple indexes and sorts on multiple keys. *Data Edition*'s strengths are input editing, clear error messages, and ease of use. It certainly isn't a threat to *dBASE III*.

The spreadsheet package, *Plans*, is more intriguing. It seems as though IBM reached back into 2 decades of experience with mainframe financial modeling packages, combined it with first-rate screen ergonomics, and rolled it all together into a slick package.

Plans's big story is auditability. One of IBM's central precepts has always been to please the finance people, which *Plans* will certainly do. While some may consider the separation of data from formulas to be regressive, you can actually read a *Plans* model as if it were a program listing, because that's what it is. More than any other popular spreadsheet product, *Plans* embodies a high-level language that manipulates rows and columns of information. The syntax is more

accessible than 1-2-3's cell formulas and it may become as popular as *dBASE II*'s command language.

The Business Management Series includes the "core four" accounting pro-



Bill Machrone

grams and also includes order entry, billing, and inventory accounting. The mix is precisely the same as the one IBM has sold on its old General Systems Division machines for years. The packages seem complete and workmanlike. You wouldn't expect less from IBM.

The good news is that both series clearly exhibit a common parentage. Their use of color, error messages, and screen numbers, as well as the overall flow of the programs, is completely consistent. Most software users will agree

that it's about time someone paid attention to consistency.

The Space Race

There's a lot to like in these new packages. The Three Magic Letters would be an immeasurable aid to their success even if they were only mediocre, but they're not mediocre; they're strong. Retailers will doubtless stock both series and have an easy time selling them. The experienced user will value the quality of the documentation, the telephone support, and the completeness of the programs. The neophyte will be attracted to the IBM logo and to the exceptional ease of use. If that weren't enough, the training materials are simply the best I've seen for a personal computer product, period.

What do these attractions mean for the end user? IBM has taken on the least-consolidated, least-capitalized, and least-standardized group in the computer business, the software industry. IBM has said, in essence, that the pioneer days are over. Some software companies will doubtless fold as a result of these product introductions. It'll take time and IBM won't be the only factor, but it'll happen. And that's the bad news.

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Given the current madness in the PC industry with its spur of the moment pricing and instant product introductions, *you will find it always pays to call for our latest prices.* You will be glad you did.

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EDITOR'S SCREEN

reasons to carry packages, whether inferior or not, that the uninformed consumer deems less worthy than their IBM equivalents. A likely negative effect is fewer

creative entries in the software marketplace, which probably means that talented software designers will look elsewhere for their kicks.

Selling MIPS, Selling Color

One of the most time-honored chestnuts in the computer industry is that IBM is in only one business, hardware—selling MIPS (millions of instructions per second). This rule's first corollary is that software exists to sell hardware. Was IBM disappointed in the quality of the available software and altruistically determined to better the user's lot? Or is it just trying to sell more iron?

IBM's new software products certainly require more machine horsepower than the competition. Looked at one way, they are just disk-bound salepeople for the PC AT. The Personal Decision Series is so large it will dominate your PC XT; it has no place on a floppy-based machine. The Business Management Series is extremely disk-intensive; the PC AT's combined speed and storage capability makes it the ideal vehicle. While small businesses with XTs can use BMS successfully, seeing the speed of the software run on an AT may make them throw rocks at their existing machines.

Color is another side of the software story. All these IBM programs will run on monochrome systems, but their appearance in color is so spectacular that you wouldn't think twice about the additional expense of a color board and monitor. In this case, the software isn't selling more processing power, but greater ease of use through additional hardware.

You, the consumer, are in a position to make or break independent software companies. If you make your purchasing decisions on an "if it says IBM, it must be good" basis, you'll be doing irreparable harm to this industry. If you take the time to make informed decisions based on your needs and the software packages' features, you'll be strengthening the industry by voting with your dollars. The independents, in turn, owe you their best creative efforts.

The bottom line is this: If IBM software does the job for you, buy it. If it doesn't, *don't settle*. You can't afford it and neither can the industry. ■

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The UNIX Horizon

UNIX fans have always believed their system was better than DOS. Now, with the release of the PC AT, many think UNIX will become the industry's preferred operating system.

The software and hardware standards that have evolved from the remarkable success of the IBM PC and XT have stabilized the microcomputer industry, but at the expense of some sophistication in applications programs developed for the PC.

Now, however, the introduction of the IBM PC AT and UNIX for the PC signals a new set of standards that promises to correct these deficiencies and open new horizons for software developers.

In the past, PC software developers have never even considered the advantages of doing two or more things at once because DOS is not multitasking. Moreover, the DOS file system is limited to 32 megabytes, so a PC cannot function as a file server that controls, for example, a 140-megabyte Dragon disk for use by other personal computers. In addition, DOS does not handle interprocess communication, so developers have had to write their own subroutines for exchanging data among processes.

Developers also faced limits at the firmware level. The IBM Basic Input/Output System (BIOS) interface and character generation have bottlenecked throughput and encouraged developers to bypass BIOS wherever possible or to reach around DOS into low memory to enhance performance.

At the hardware level, the PC's slow

floppy and hard disk drives have further impeded efficient I/O.

How did developers respond to this environment? Predictably, they wrote assembly language-based programs for



Gig Graham

speed, avoiding high-level languages; developed proprietary intertask communication algorithms; provided export programs for different data formats; and avoided network-based software.

Today, few applications programs that depend on DOS call for program execution—with the exception of disk I/O—and many avoid the support of firmware. As a result, PC software developers haven't learned the advantages of depending on the operating system.

A New Direction with UNIX

The UNIX philosophy is a major departure for an industry that has evolved with DOS and the IBM PC architecture. The availability of UNIX on the XT and AT offers opportunities and solutions that are yet to be appreciated by software developers.

The UNIX kernel and most UNIX programs are small and modular, and they work together—unlike their DOS counterparts. Furthermore, independently developed UNIX applications use a common data format and can talk to each other.

UNIX encourages developers to write programs independent of a basic hardware architecture, rely on system calls to execute programs, and write in high-level languages such as C. The limitations of PC-DOS, the BIOS, and disk I/O are effectively overcome.

After all the operating systems are compared and checklists tabulated, UNIX aficionados believe that the economics of software development will make UNIX the preferred microcomputer operating system. ■

Gig Graham is a cofounder and executive vice-president of VenterCom, Inc., of Cambridge, Massachusetts, which develops UNIX-based software systems.

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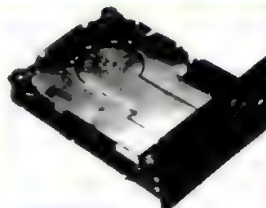
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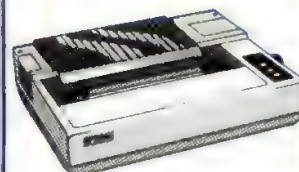
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Letters to PC

Database Review Comments

Like many loyal *PC Magazine* readers, I eagerly awaited the review of the Category 4 databases in your "Project: Database" (*PC*, Volume 3 Numbers 11-17). Much to my surprise, you did not include *MDBS III* from Micro Data Base Systems, Inc.

I'm sure that you were aware of its existence because you reviewed *KnowledgeMan*, a spinoff product from the same company. You reviewed other nonrelational database products, so *MDBS III*'s extended network capabilities were not the problem. Perhaps you could not find a suitable reviewer.

In my opinion, *MDBS III* is the most powerful database management system available today on a micro. This is not a product that has migrated from a mini or mainframe to a micro. I believe *MDBS I* was originally developed for an 8-bit micro. *MDBS III* is now available for a 16-bit machine, including the IBM PC under PC-DOS, MS-DOS, CP/M-86, MP/M-86, UNIX, and XENIX. Multiple users, as well as single users, can be supported.

MDBS III's ability to maintain complex relationships between record types directly within the database dictionary is crucial for applications such as accounting systems. With a flat file relational database, it is possible to have a POSTING file with an ACCOUNT field having the value 3,400 and a CHART-OF-ACCOUNTS file where 3,400 does not exist as an ACCOUNT.

Owing to the price and the complexity of *MDBS III*, it is obviously not the package for the average end user. However, it is terrific for an application developer. I am working on an advertising management system for periodical publishers using *MDBS III*. If I had not had the power of *MDBS III*, I would never had attempt-

ed such a complex project.

Amanda B. Cross
Boston, Massachusetts

We chose not to include MDBS III in "Project: Database" because it is so much more advanced than any of the others—even in Category 4. We felt that it was in a category of its own. A separate review of MDBS III appeared in a previous issue. It was written by Frank J. Derfler, Jr., and entitled "MDBS the Third: If You Have to Ask the Price" (PC, Volume 2 Number 1).—Ed.

I'd like to tell you how much I enjoyed your series of database reviews in "Project: Database." I eventually bought *NUTSHELL* by Leading Edge based on your review ("NUTSHELL: A Promising Preview," *PC*, Volume 3 Number 13, page 172) and Alfred Poor's recommendations.

I am very pleased with *NUTSHELL*. The whole package is very well put together. The manual and tutor program make it possible to begin using the software within hours of purchase. Leading Edge has a product it should be proud of.

Thank you again for your article and recommendation. No one at any of the computer stores I went to had even heard of *NUTSHELL*.

Bruce A. Gaughran
York, Pennsylvania

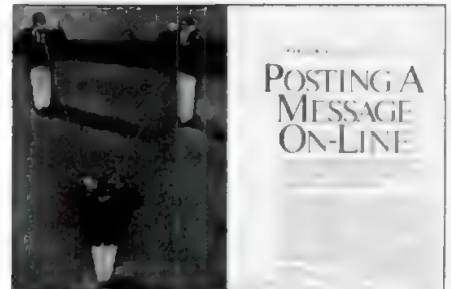
West Coast Communications

I am a regular reader of *PC Magazine*, and I'd like to thank you for your excellent series of articles on on-line databases (*PC*, Volume 3 Number 20). The articles covered one of my favorite topics—the growing use of PCs in communications.

Bulletin boards users find the services

of public-domain software, technical information, and camaraderie to be a vital addition to other PC applications.

I felt that M. David Stone's article, "Posting a Message On-Line," which summarized the services of ten on-line bulletin boards, contained a certain bias. His choice of ten boards to use as exam-



ples included five in the area from New York to Washington, D.C., and only one in the Far West. There are many active boards in southern California that he did not include in his summary.

My own board, RBBS of Pacific Palisades—on-line 24 hours a day, 300/1200, xmodem, (213) 359-6480—has grown to over 500 files for downloading and a message base specializing in technical and applications questions. Callers to my board will also find a long list of other bulletin boards in southern California and the Far West.

Californians no longer have to call across the country to find some of the best bulletin boards available!

Michael Rothman
Los Angeles, California

More 2400-BPS Modems

In the closing sentence of "Whizzzzzz . . . Here Come the 2400-Baud Modems" (*PC*, Volume 3 Number 18, page 51), my comment regarding the future CCITT V.32 compatible modems was somewhat abbreviated. What I suggested to the

LETTERS TO PC

writer was that this type of modem would not be immediately applicable and hence not widely marketed in the microcomputer communications market, which I think is the market of interest to *PC Magazine* readers. It is possible that these 4,800- and 9,600-bps modems may never achieve the popularity of the 300-, 1,200-, and 2,400-bps devices for the personal computer user. However, there is little doubt that these modems will be marketed in more traditional data communications markets.

Second, although the writer correctly observed that the AT&T announcement of its new series of modems will "legitimize" the 2400-bps modems in the domestic market, he failed to make it clear that AT&T, while an important entry, is still somewhat late in this well-established but unpublicized market niche. The companies mentioned in the article (Concord Data Systems, Vadec, Ocdex, Rixon, and Micom), as well as a few others, have announced 2,400-bps dial-up products. CDS has shipped over 10,000 2,400-bps modems including the autodial version that is supported by many of the most popular PC communications software packages. Even though you may not find them at your local computer store yet, 2,400-bps modems do not belong to the family of products referred to as vaporware.

Mark Lovington
Concord Data Systems
Waltham, Massachusetts

Fast Can Be Even Faster

In reference to the article "BASIC Labeling" (*PC*, Volume 3 Number 18), if the user adds :RETURN to the end of lines 21 through 25 of Figure 3 (page 376), the program will run much faster. This is because it would not have to execute all of the following IF commands.

Thacher's article had an excellent solution to the problem of having no variable labels in BASIC.

Peter Ansbacher
Columbia, Missouri

Jerrold Thacher replies:

This is indeed a way to make the program run faster. However, the program is very fast the way that it is, and the difference in speed is minimal.

Comments on Compatibility

I was very interested to read Peter Norton's article "A Modest Proposal on Compatibility" (*PC*, Volume 3 Number 15). I heartily endorse what he seems to advocate about IBM PC compatibility. I suspect that other computer users around the country would agree.

In my office we have several Texas Instruments PCs that require a hard disk and MS-DOS 2.11. On the last page of the MS-DOS manual (in Appendix D) you will find a program called EMULATE.COM that makes the TI emulate an IBM PC. The information in the manual is very sketchy and also very technical.

I wonder if Norton could comment on this, since it seems to embody what he advocates in his article. I was wondering if his own *Utilities* would run on the TI with this emulator program.

James M. Brandes
San Antonio, Texas

Peter Norton replies:

The TI Professional does indeed have an EMULATE command program, which will increase the machine's degree of IBM PC compatibility. However, as Brandes points out, the information that TI publishes with it is very sketchy. I haven't had a chance to dig very deeply into it. Unfortunately, it appears that TI has left their customers some detective work in order to understand the EMULATE command. It's my understanding that EMULATE brings the TI much closer to the PC in terms of ROM-BIOS operations. EMULATE, I believe, covers IBM BIOS calls that the TI's native BIOS doesn't.

Unfortunately, this doesn't make that much difference. Most important PC programs write their output straight to

the screen, and direct screen output works quite differently for the TI. If you're interested in technical details, the story of how the TI works is fascinating; if you want to run IBM programs on a TI, the story is depressing.

The bottom line is that those PC programs that work entirely through the BIOS and DOS will run on the TI with the help of EMULATE. Programs that do direct screen output need custom-written TI drives. This usually means that you can't run IBM software on a TI. Instead, you have to get a TI version of 1-2-3, Word, or the software of your choice. In the case of my Norton Utilities, the 3.0 version will run on the TI as easily as on a PC. And you're gonna love it.

Norton Goofs Too

In Letters to PC, Hop Hopingardner writes, "And I'll bet Norton will admit that he still occasionally hits the letter O when he means 0 (zero)" ("Confusions, Confusions," *PC*, Volume 3 Number 18, page 91).

I will not admit to doing it occasionally. I do it often. Repeatedly. Every day.

After a while it makes me think my brain is wilting.

Peter Norton
Santa Monica, California

Unfinished Program

I just read "Adapting Your Display for Speedy Updates" by David McManigal (*PC* Volume 3 Number 16). The article was very interesting; however, the sample program using FULSCRN in BASIC (page 235-236) is not finished. Both I% and J% loops have no NEXT. Also, I don't see any CALL to make it work. Can you help me?

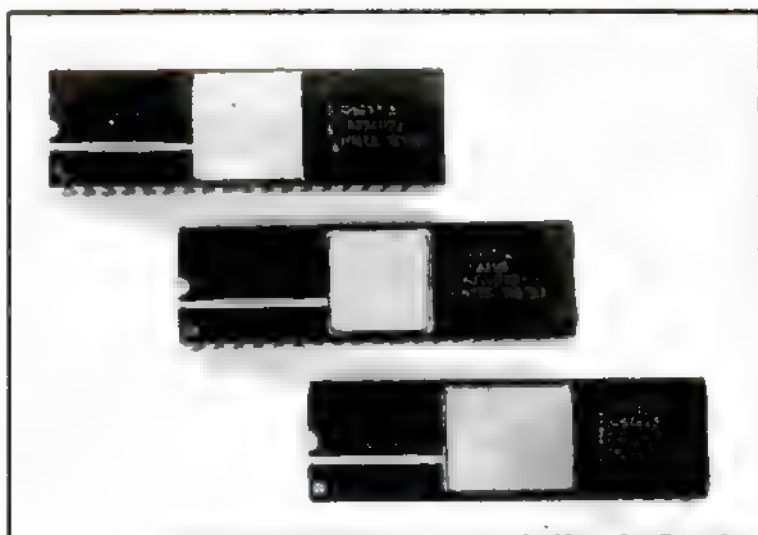
Real Philippon
Laval, Quebec, Canada

The article "Adapting Your Display for Speedy Updates" by David McManigal was really interesting. However, the BASIC example seems to be incomplete.

Also, I would like to link the assembly

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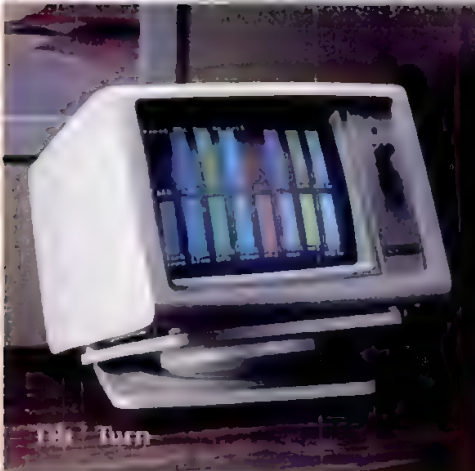
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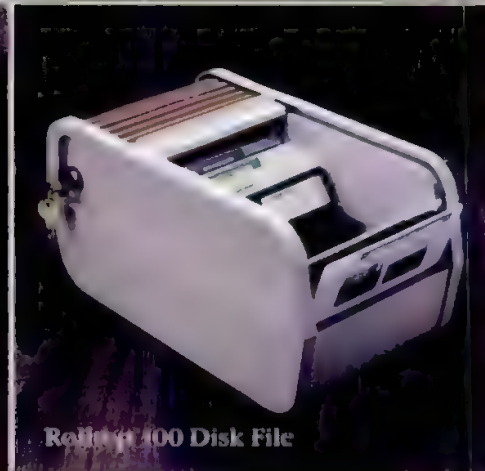
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program directly with a BASIC program. Then I would like the BASIC program to BLOAD a screen directly into the array called SCRN\$() and have the assembly program place it on the screen. I have not been able to accomplish this task. Could you give me some help?

Arthur Sterling
Fort Lee, New Jersey

David McManigal replies:

Somehow the last line of the BASIC example was dropped. The missing line should have read:

```
410 NEXT I% CALL FULSCRN%  
    (SCRN$(1)): NEXT J%
```

Of course, the example does nothing without this line.

Regarding Sterling's attempt to link FULSCRN into a compiled BASIC program and to use BSAVE and BLOAD to store and retrieve screens, there are a couple of problems to be overcome.

First, the SCRN\$ array is not stored contiguously, so BSAVE and BLOAD can not be used to save and load SCRN\$. However, the string length value in compiled BASIC is a 2-byte integer rather than a 1-byte value. Therefore, strings may contain up to 32,767 bytes, and SCRN\$ may be defined as a single string and accessed through the use of the MID\$ and LSET functions.

Second, because the compiled BASIC string length is a 2-byte value, the FLSCRN code, shown in Figure 2, must be modified. References to register CL should be changed to CX, and the string offset is no longer used if SCRN\$ is defined as a single string rather than a string array. Instead, the string data follow the string length. Because the contents of each screen are contained in one string, the loop to handle 25 strings must be deleted.

Office Standards

The readers of the excellent articles on "Well-Tailored Workplaces: IBM and the Human Factor" (PC, Volume 3

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Number 19) may be interested in the standards required for office workers in the Federal Republic of Germany.

As the executive director of the United States Pavilion at Orgatechnik (the biennial international computer, office products, and furniture show to be held in Cologne this year), I have learned a great deal about the different standards found in the office environment in the United States and in Western Europe. The standards in Western Europe are quite rigid, and the basic premises are extremely well thought out. For example, instead of having the CRT tilted so that it can be seen, try raising it so that the top line of text is about at one's eye level. I can almost guarantee that you will find that fewer errors are made and that one does not tire as quickly.

The fixed height of the desk is determined by exhaustive measuring of individuals. Eye examinations for those working with CRTs are required every 5 years if you are under 45. If you are over 45, eye examinations are required every 3 years. To quote the safety regulations manual, corrections should be made so that the person concerned can read without difficulty at a viewing distance of 450-600 millimeters.

The following is a selection from the safety report that will be of particular interest to all who sit in front of a CRT for hours at a time:

"At present, the display of light characters on a dark background predominates over that of dark characters on a light background. A better adaptation to human capabilities and to the working environment is expected with the display of dark characters on a light background. This representation is strongly recommended to be considered in future development."

The report also makes the following points: reflections are less disturbing with dark characters on a light background; it is better to match the luminance level of the screen and the document you are reading; the higher luminance level of the screen reduces the

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LETTERS TO PC

contrast with the office environment; and, the legibility is improved with dark characters on a light background.

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Judson H. Spencer
New York, New York

Corrections:

The price of *Direct Access*, the menuing system from Delta Technologies that was discussed in Norton Chronicles ("Wake Up to Menuing Systems," *PC*, Vol. 3 Number 20) has been changed. new price is \$59.95, and Delta Technologies's phone number, which printed incorrectly in the article, is (832-0958).

In "Project Management with the (*PC*, Volume 3 Number 21, page we incorrectly listed Decision Software as the creator of *EX-PEH*. The real manufacturer is Decision Software, P.O. Box 7876, A TX 78713, (512) 926-4527.

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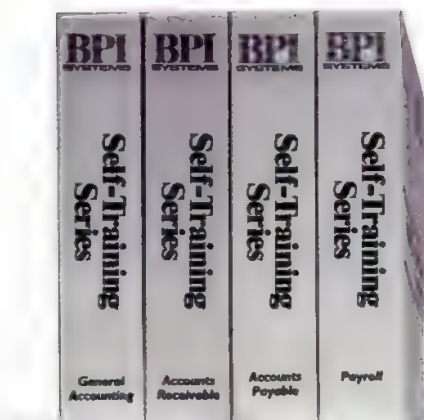
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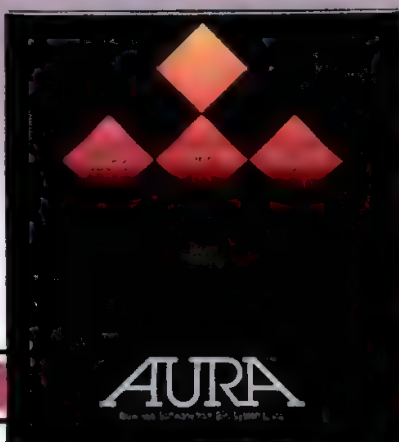
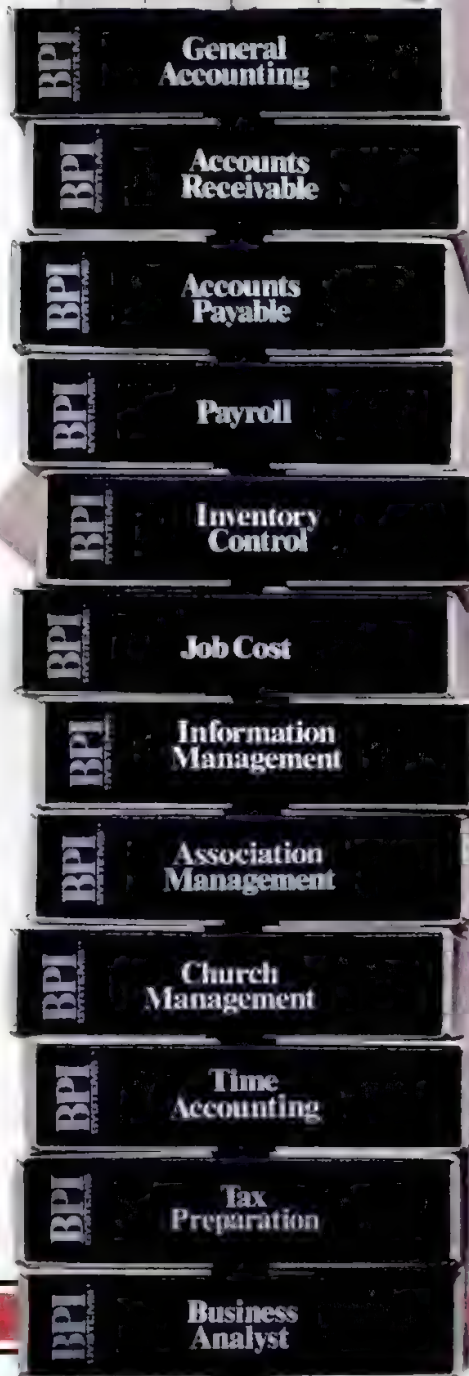


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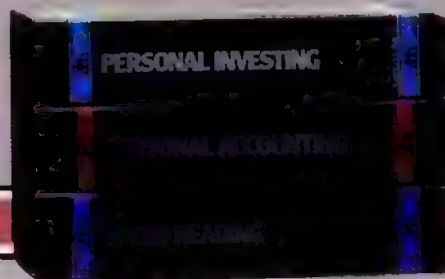
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Disk Storage On the PC AT

The PC AT's expanded memory capacity and built-in hard disk led IBM to choose new disk storage strategies for its 20-megabyte hard disk and high-capacity floppy disk drive.

When IBM unveiled its hot new PC AT, it also presented two new varieties of disk storage: 1.2-megabyte high-capacity floppy disks with four times the storage capacity of previous floppy disk formats and a 20-megabyte fixed disk, which has twice the capacity of the XT's fixed disk.

These two new disk formats reveal some interesting insights into the strategic decisions behind the design of any disk format. A look under the cover of IBM's disk formats will show how the strategy works. Even if you're not interested in the technical side of disk storage, the practical implications make the question well worth your attention.

Sectors

All of the PC's disk formats—both diskette formats and hard disk formats—share the same “atom” of storage: they all stuff their data into disk records, called sectors, of 512 bytes ($\frac{1}{2}$ K bytes) each. However big a data file is, it gets enough 512-byte sectors to store the data. The size of a data file is rarely an exact multiple of 512 bytes, and so the sector at the end of each file is partly used to hold the last part of the file's data and partly left over as unused slack.

Originally, single-sided floppies allocated these $\frac{1}{2}$ K sectors to files one-by-one, individually. When larger for-

mat—such as double-sided disks—started appearing, it no longer seemed like a good idea to allocate the sectors one-by-one. There is a very simple reason for this: when you allocate sectors



Peter Norton

one-by-one, you have to keep track of them one-by-one.

The computer keeps track of disk space in a table called the File Allocation Table, or FAT. The FAT is stored on the disk and is held in the computer's memory while the disk is being used. The more individual sectors that there are to keep track of, the bigger and more unwieldy the FAT gets. And, since the FAT controls how disks are used, activity inside the FAT is quite intensive. If the FAT gets hard to manage, it can bog down the

whole computer. The idea of a cluster is one answer.

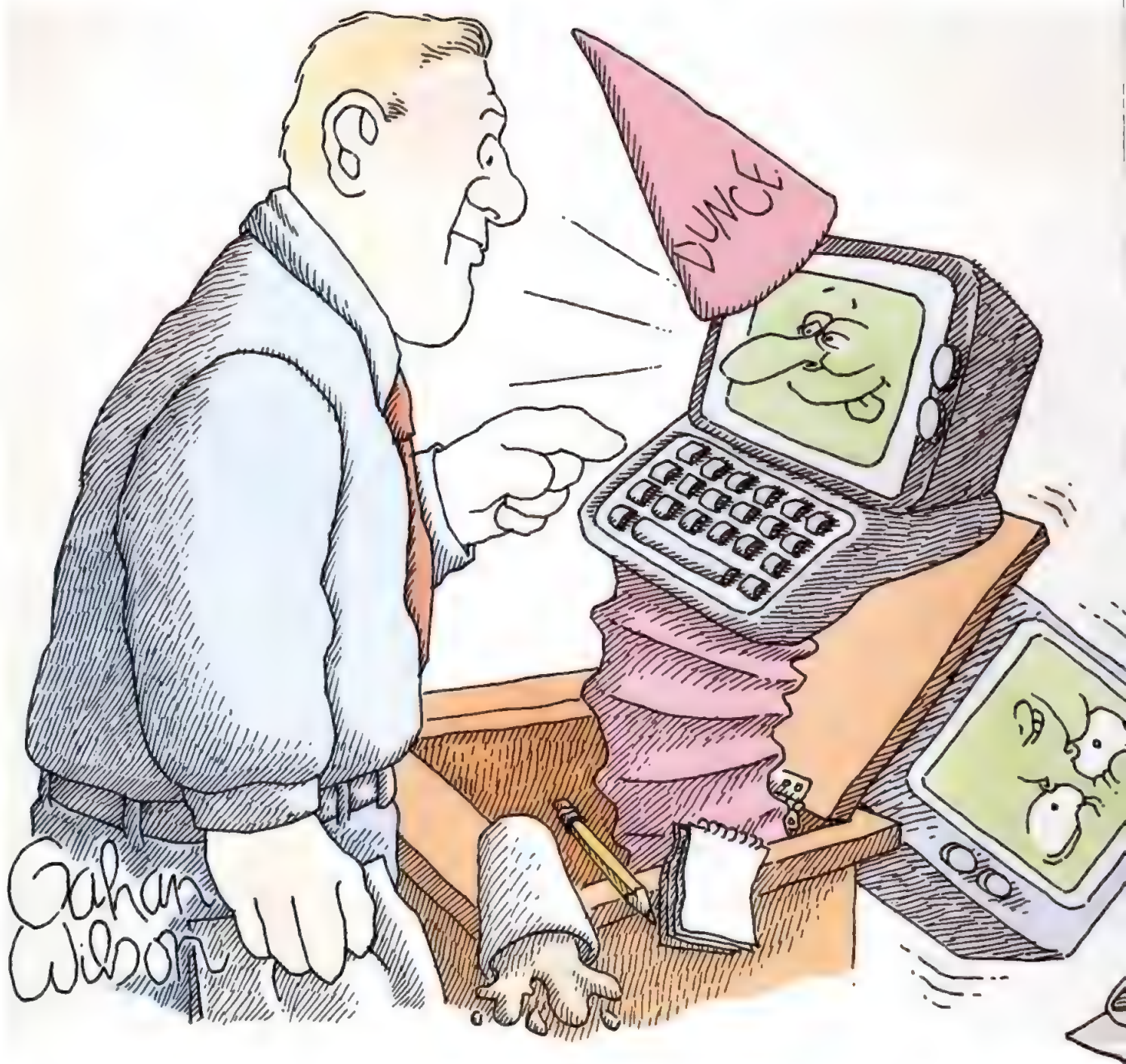
Clusters

Clusters are simply several sectors of disk space treated as a unit. The purpose of a cluster is to manage disk space in units larger than individual sectors. On a double-sided disk, a cluster is two sectors, or 1K of storage; on the XT's 10-megabyte hard disk, a cluster is eight sectors, totaling 4K of storage.

The size of a cluster is fixed within a given disk format. It doesn't vary from place to place on a disk, and it doesn't vary from disk to disk. You have no control over it—the cluster size is a designed-in element of DOS, chosen by DOS's architects.

Several interesting things happen when the size of a cluster is increased. The most obvious change—the one that hits you immediately when you start loading up disks with files—is that a larger cluster has more slack at the end of each file. On the average, whatever the size of a cluster—that is, whatever the size of the fixed units in which disk storage is allocated—each file will waste half of the end sector. Some files, of course, will be just the right size to fill their last cluster, leaving little wasted space; others will just barely spill over into another cluster, leaving most of it as

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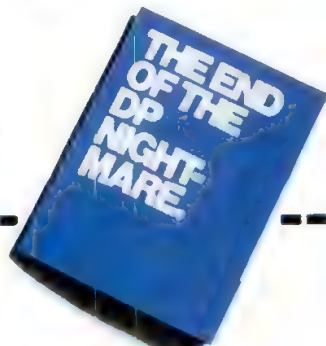
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NIGHTMARE.

slack. Under most circumstances, though, it averages out to a slack waste of half the cluster size for each file.

What does that mean in practical

terms? The XT's 10-megabyte hard disk has a cluster size of 4K (eight sectors). This means that, on the average, each XT file has 2K of slack. My hard disk was

nearly full with about 950 files: 950 files times 2K comes to almost 2 megabytes of slack, or nearly one-fifth of my entire disk space. Relative to what's available, that's a lot of waste.

The AT

By way of contrast, take a look at the AT's 20-megabyte hard disk. You'd expect that the cluster size would be larger in proportion to the increased capacity of the disk. In fact, at 2K (four sectors), it's just half the size of the XT's cluster.

I mentioned that my 950 XT files wasted about 2 megabytes, or nearly one-fifth of the 10-megabyte disk. Of course, not all of that waste is avoidable, but some of it is. As a case in point, in the AT's hard disk, with a 2K cluster, the average slack is only 1K, instead of 2K as it is on the XT. Those same 950 files take up an entire megabyte less space on the AT than they do on the XT, for a real-world storage savings of 10 percent.

You pay a price for making the cluster size smaller, however. Disk storage space is managed in the FAT, and the FAT has one table entry for each cluster, or each unit of disk storage space, on the disk. Halving the size of the cluster—using disk space more efficiently—doubles the size of the FAT. A bigger FAT doesn't mean much when it's stored on disk because it's relatively small compared to the space on the disk. The problem comes when DOS needs to work with the FAT inside the computer's memory.

DOS keeps a copy of the FAT in memory for any disk in use. For a disk with a small FAT, such as an ordinary floppy disk, that's not much of a problem. Floppy disk FATs take up 1K or less, which is practically nothing. The XT's 10-megabyte hard disk takes up 4K, which is quite a bit more, but, still, it doesn't take a significant bite out of memory space. When you get to the AT's 20-megabyte hard disk, however, it's another story. The FAT for that disk takes up an amazing 20K. That is significant.

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CIRCLE 106 ON READER SERVICE CARD

Everything Is Relative

In the modern era, it seems that few PCs have less than 256K of memory. The AT comes with a minimum of 256K, and 512K is common. Thus, IBM didn't have to be stingy about setting a good chunk of it aside to hold the FAT and other disk buffers. And that's why the AT's designers felt it was dandy to have a disk with a monster 20K FAT.

The basic design factors for the AT's 20-megabyte hard disk are the same as those for the XT's 10-megabyte hard disk: they both require a relatively large cluster size to manage the enormous amount of space, though in the case of the AT, IBM tilted the scales toward a smaller cluster, and not a larger one.

A look at the AT's 1.2-megabyte high-capacity floppies, however, tell a different story.

Like most disk formats, the 1K (2 sector) cluster size of a regular double-sided disk was designed to balance efficient disk storage (which calls for a small cluster size and a correspondingly larger FAT) against efficient processing (which calls for a smaller FAT and larger cluster size). The AT's high-capacity floppy takes a different approach.

Designers of disk formats have to consider the purpose of the disk as well as memory size and disk capacity. Regular floppy disks and hard disks tend to be used—actively read and written—heavily. Performance is key. But the AT's high-capacity disks were designed to be used primarily as an archive medium for backing up the AT's hard disk.

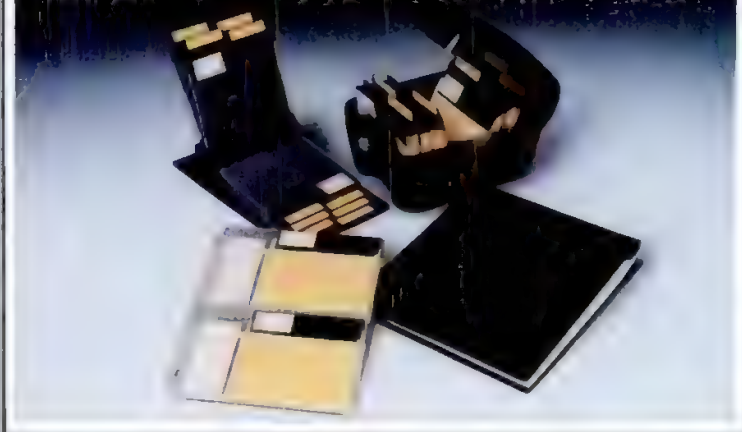
With that in mind, IBM reduced the high-capacity floppies down to a single 512-byte sector. That boosted the FAT size up to 3½K, almost as big as the FAT in the XT's 10-megabyte hard disk. But it cut wasted slack space to a minimum—averaging a mere 256 bytes for each file stored. This maximizes the amount of data that can be stored on each floppy disk, although it makes the computer work harder to store it.

That's the basic story behind how stor-

age is laid out on these two new drives. I haven't touched on how the computer's memory gets set aside to hold the FAT, or on how to make it run more efficient-

ly. As it turns out, a simple item can make a huge difference in how efficiently your computer will run. I'll dig into that topic in an upcoming column. ■

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your sales forecast in a graph? Without Pronounce, you have to think about and execute quite a few keystrokes.

/gtaxb6..m8(enter)ab8..m8(enter)bb18..m18(enter)ogboqv

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Of course, if you'd rather pound the keys 184 times...

```
{Home}{down}{down}{down}{down}{down}{right}{F2}*
1.1{enter}{right}{F2}* 1.1{enter}{right}{F2}* 1.1{enter}{right}
(F2)* 1.1{enter}{right}{F2}* 1.1{enter}{right}{F2}* 1.1{enter}
(right){F2}* 1.1{enter}{right}{F2}* 1.1{enter}{right}{F2}*
1.1{enter}{right}{F2}* 1.1{enter}{right}{F2}* 1.1{enter}{right}
(F2)* 1.1{enter}{right}{F2}* 1.1{enter}{right}{F2}* 1.1{enter}
(right){F2}* 1.1{enter}{right}{F2}* 1.1{enter}{right}{F2}*
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(right){F2}* 1.1{enter}{right}{F2}* 1.1{enter}{right}{F2}* 1.1{enter}
ogbcqv
```

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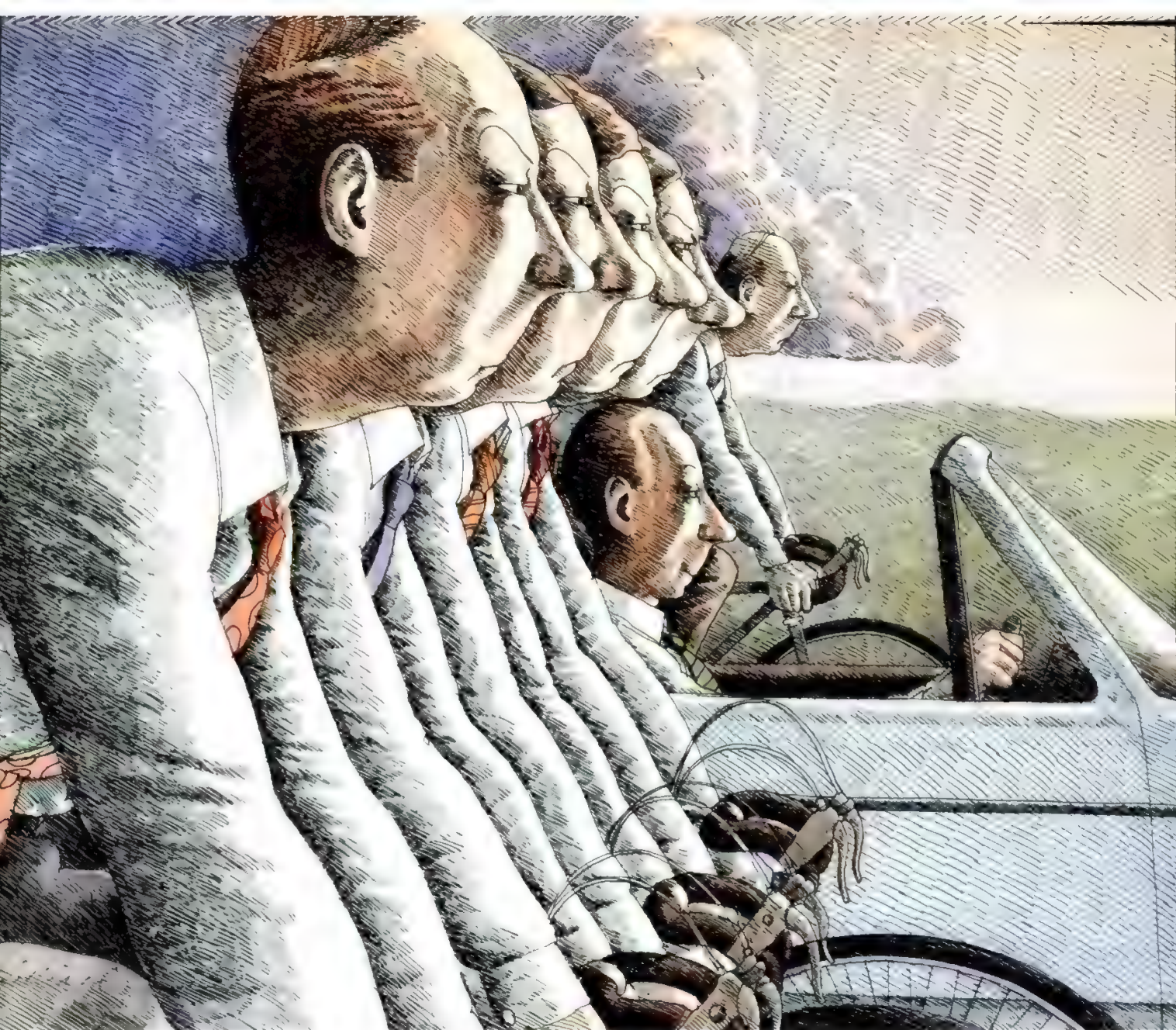
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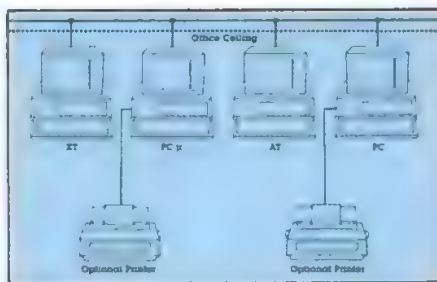


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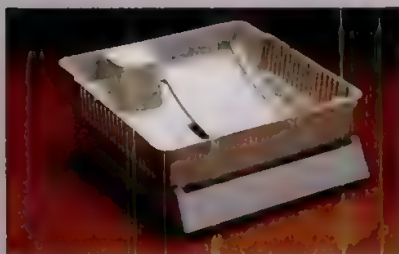


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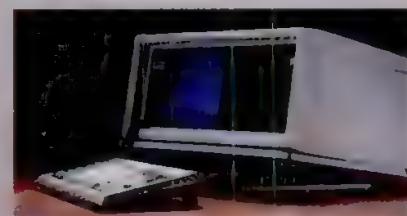
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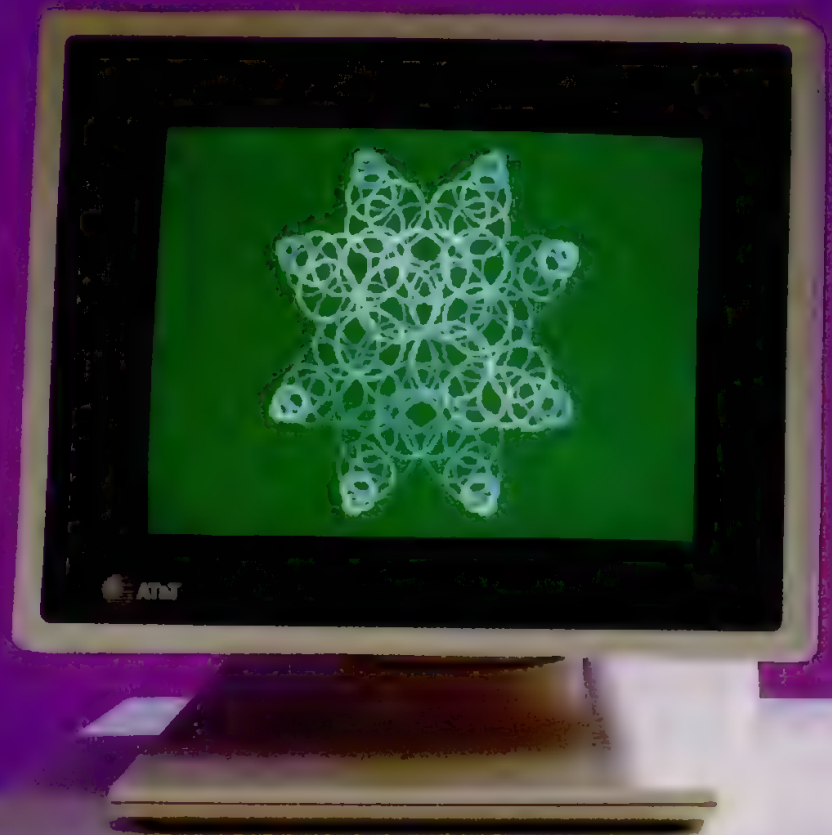
• COVER STORIES •

NEW COMPATIBLES: CHALLENGING DESIGNS

1984 HAS BROUGHT with

it a plethora of new microcomputers ready, willing, and possibly able to challenge IBM's PC and XT for control of the market. But how many machines in the expanding universe of PC-compatibles can really measure up to the standards of their competition? In the following pages, we put eight of the most recent entries in this constantly changing market through their paces and try to discover which can hold their own and which will fall by the wayside.

AT&T and IBM have begun slugging it out in the microcomputer arena like Godzilla and King Kong. AT&T's new PC 6300 is a respectable first punch, but hardly a knockout blow.



COVER STORY • PAUL SOMERSON

A STEP INTO THE RING
**THE AT&T
PERSONAL
COMPUTER
6300**



Now let me get this straight. A few years back the phone company tried to enter the computer business but was tethered by the U.S. Department of Justice. What Ma Bell wants, Ma Bell gets, and your friendly U.S. government obligingly changed the rules. AT&T kept its research, administrative, and manufacturing operations (as well as its profitable long-distance lines) and threw the rest of the massive corporation to the mercy of the Wall Street wolves. In the resulting tohubohu, consumers became utterly confused about who was supposed to fix what, and service in some areas approached that of Third World nations in mid-coup. All this to let AT&T sell micros. Its PCs had better be worth it.

AT&T's initial micro offering, the Personal Computer 6300, isn't bad. It's a sturdy, respectfully IBM-compatible, decently engineered, high-revving, 16-bit Italian speedster with a competitive sticker price and a few extras that may make it attractive to the rock-ribbed corporate crowd. This machine, which is an Americanized version of Olivetti's M24 computer, wouldn't turn heads without the grooved globular logo glued to its chassis, but these days it's marketing muscle and company image rather than astonishing performance that move computers off the shelves. The 6300 is not going to stampede hordes of individual buyers into AT&T sales offices, but many large businesses may bite, figuring that anything

hammered out by the favorite refuge of widows' and orphans' billions must be okay.

The fundamental question is why buy the AT&T 6300—or any compatible computer, for that matter—when you could take home an IBM PC, XT, or AT instead? No non-IBM machine can be 100

WHY BUY AN 8086, EVEN A NIMBLE 6300, WHEN FOR A FEW DOLLARS MORE YOU CAN OUTFIT YOUR COMPANY WITH THE REAL THING?

percent PC-DOS-compatible; programs that use even mildly exotic BASIC POKES or that make end runs around BIOS can stop most PC-alikes in their tracks. And purchasers of such incompatibles always have to wonder whether the next call to the manufacturer's Help Hotline is going to be answered by a scratchy tape recording with the word "disconnect" in it.

No one has to fret over AT&T's longevity. It will be here long after you and I are just dust on someone's video screen. In fact, AT&T is prepared to weather any chilly nuclear winter with the giant corporation's underground command bunkers, fiber-optic arteries that laugh at disruptive EMP, helicopter squadrons to whisk pampered executives to safety, and other Strangelovian contingency plans. The question is, of course, whether the corporation will honor your warranty after the fallout settles.

Standard Brands

IBM's PC is certainly not the fastest machine on the market. It's not the cheapest, or the most powerful. But it is by now the unquestioned standard (especially in its PC AT incarnation), and the only reason to buy a nonstandard machine would be that it substantially outperformed the PC, ran virtually all available PC-DOS software out of the can, and had a nameplate on the front that reassured you the company would be around to support it after the next wave of corporate winnowings. Cost is not such an important consideration these days; margins are tighter and prices closer, and unless a manufacturer has to perform some eleventh-hour alchemy to turn steel and silicon into bankruptcy-staving gold, buyers won't really save a bundle. And the economy of such a "99 percent compatible" system pales when some trendy new program you can't wait to try falls among the 1 percent that brings your machine to its knees.

The newest wrinkle is that IBM's PC AT is such a rocket ship of a computer that it is throwing the entire market for a major loop. Why buy an 8086 machine, even a nimble one like the 6300, when for a few dollars more you can outfit your company with the very best? AT&T will undoubtedly retaliate, perhaps by dropping an 80286 into its 6300 chassis, perhaps by rushing a feisty 32-bit DOS and UNIX desktop into production. In any event, you can bet the farm that AT&T's executives view IBM's PC AT as a solid left hook that staggered them, but is far from a knockout blow.

Finally, the specter of a proprietary operating system and tachycardiac chip rumored to be at the heart of IBM's next generation of multitasking micros should send shivers down the spine of any prospective computer purchaser. IBM's current PC is an "open" system—where all the specs are published and all the chips are off the rack. While this contributed to the machine's early success by making it a snap for third-party vendors to churn out truly compatible peripherals and software,



AT&T Personal Computer 6300

AT&T Information Systems

National Sales Center

111 Westwood Place, Suite 300

Brentwood, TN 37027

(800) 247-1212

List Price: \$2,810 with dual floppy disks, DOS, and 128K RAM; \$4,985 with hard disk, DOS, and 256K RAM.

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it also spawned a slew of copycat computers that siphoned off a bit of IBM's business. Future IBM releases may not be so kind. And if you think the big software houses a year or two down the road are going to release one main version for IBM equipment and a dozen slightly different ones for the bevy of incompatibles, you're

Of course, just being big doesn't guarantee success. Xerox had an early chance to lop off a large hunk of the business computer market; while the company's Ethernet network has given it a small measure of success, its overall share is a slender collop compared to that of the major MS-DOS players. And Xerox was techno-

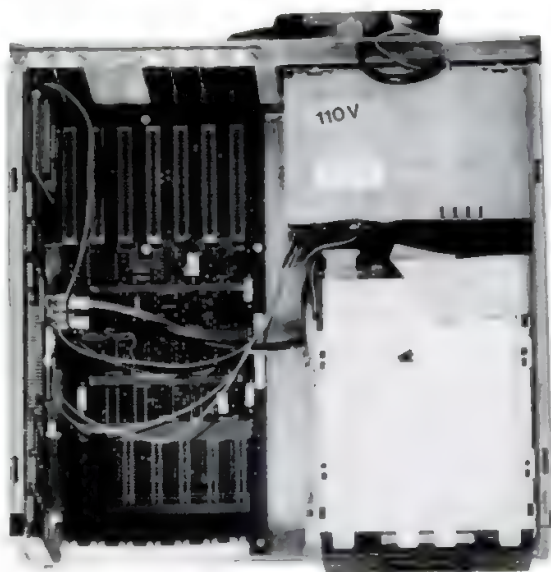
shall tried to sound menacing as he welcomed "an electronic high noon." (Get it? Marshall? You can almost see the chairman in front of a mirror boning up on Cooper's flinty stare.) Not a computer feeding frenzy, mind you, but a steel-jawed *mano-a-mano* versus the bad guys in the Blue hats, one-to-one, winner take all, loser eats dust. You must have your head pretty far down in the sand to believe the new AT&T advertising slogan "Watson Watch Us Now" refers to Alexander Graham's storied lab partner rather than the pair of Thomas J. Watsons who pumped IBM into the megastar leagues.

This is also the reason AT&T simply repackaged Olivetti's PC-compatible M24 inside a nice safe Yankee-styled box. The smart talk on computer Grub Street all along had AT&T packing a crippled version of UNIX inside its first micro. To diffuse the criticism that AT&T had announced yet another "me-too" MS-DOS clone, Marshall reminded the nonplussed fourth estate at the 6300's release that "we have not forgotten what is out there today . . . a large, installed base of MS-DOS hardware and software." In other words, "we're not stupid." It would be awfully hard to wean the business world cold turkey from DOS to UNIX, especially with such a prosaic product as the 6300 and with so few UNIX editions of the most popular business applications yet on the scene. The 6300 is obviously just an ice breaker. What follows in 6 months may very well be a 32-bit UNIX engine, but AT&T played it safe this time around.

The current informed speculation is that AT&T will bring out a UNIX-breathing micro, possibly a workstation now being developed in conjunction with Convergent Technologies that company officials are planning to take the wraps off later this year. This new machine, based on Convergent's N-GEN, is said to handle both voice and data communication.

Lots of Slots

The 6300 comes in two basic flavors: with 128K of RAM, twin half-height



The AT&T machine as viewed from the bottom. The important chips are on the underside, which allows users to add or replace chips by removing the bottom cover without having to remove add-on boards.

an optimist. The inevitable shakeouts will leave only those giants who can go a few market rounds with the Boca Bruiser.

AT&T, with assets of nearly \$150 billion and one of the few companies that did more business last year than IBM, is in a good position to survive the rough-and-tumble. It is the premier information mover in the world. It designs and fabricates its own chips and has access to many of this nation's craftier researchers and thinkers. It boasts a massive sales, manufacturing, distribution, and service organization that can change lanes from selling and fixing switchboards to handling computers without shifting gears. It sired UNIX, the operating system most others (including DOS) are migrating towards, and sells a honey of a UNIX-driven mini called the 3B5.

logically astute; Apple raided Xerox's PARC labs to produce its new-wave Macmoric mouse/icon/menu machines. But Xerox became mired early in the CP/M world and never exploited its office presence properly. Similarly, Exxon, one of the few companies that can look down at AT&T from its lofty perch on the *Fortune Magazine* status lists and that has the resources to do anything it wants, found it was far better at moving gas than data.

IBM, Make My Day

AT&T's micro falls under the wing of the neonatal AT&T Information Systems (ATTIS), whose target is clearly IBM. At a staid Manhattan press conference beamed by satellite to half a dozen regional sites, ATTIS chairman Charles Mar-

360K floppies, and a glare-free high-resolution green screen for \$2,810 (with DOS); or with a quarter megabyte of RAM, one floppy plus a half-height 10-meg hard disk, and the same mono monitor, all for \$4,985 (including DOS). The dollar figures were originally pegged a bit higher, but AT&T sharpened its pencil when Boca slashed all the IBM prices 7 to 23 percent right before the AT&T introduction. The 6300 price floats at 5 percent less than the equivalent PC, and there is ample room for downward movement, suggested ATTIS president Frank Vigilante, since Olivetti is pushing the machines out the door "at a very competitive cost." (AT&T invested over a quarter of a billion in the giant Italian office products company and owns a cool 25 percent of it.) And he hinted that AT&T may take over the manufacturing process in the future.

Both configurations are built around a 16-bit, 8-MHz 8086-2 chip, and both offer a built-in clock/calendar with battery backup, seven expansion slots, fairly high-resolution color graphics, a trim little tilt/pan mono monitor, and parallel and RS-232 serial ports—all as standard equipment. The character set is constructed on a grid measuring 8 × 16 and is very readable; it is reasonably close to IBM's alphabet and offers the full range of character attributes.

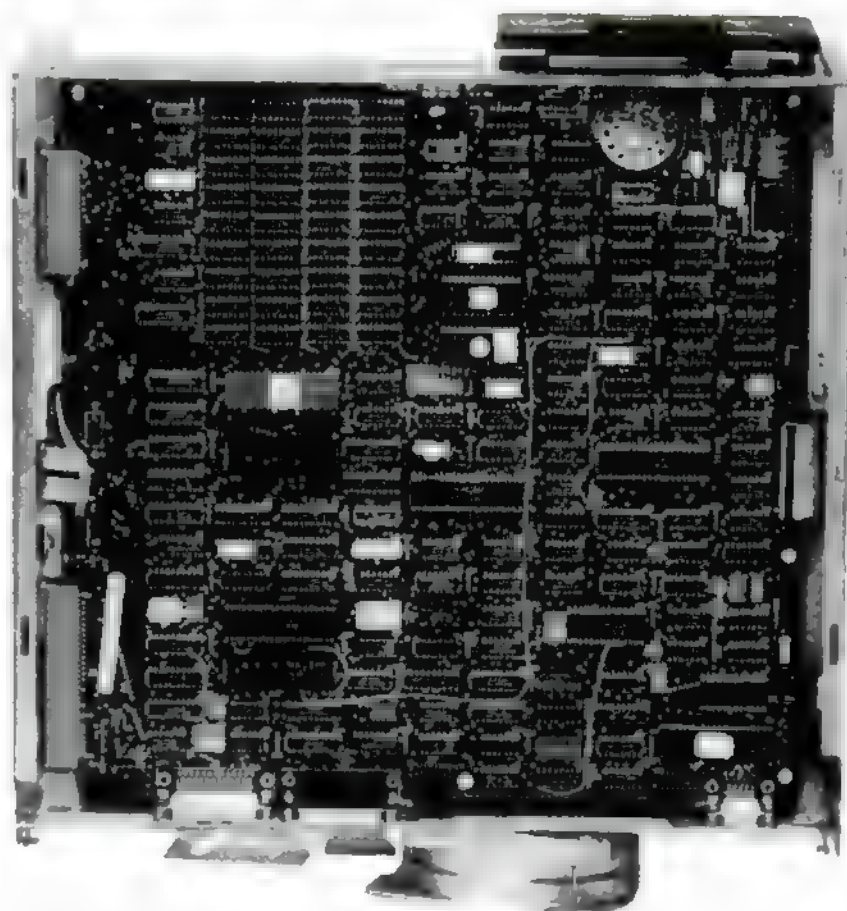
One of the slots is filled by the extra controller card in the hard disk model, and two slots have an extra socket in place for anticipated 16-bit cards. (The 6300 provides a built-in, 16-to-8-bit bus converter.) The motherboard is already drilled and soldered so that additional sockets for 16-bit boards can easily be inserted. But there's a problem—the configuration of the extra 16-bit sockets in the AT&T is totally different from that in IBM's PC AT. Since manufacturers will presumably be rushing out boards to fit the IBM 16-bit socket arrangement and not AT&T's, it's possible that AT&T will eventually want to redo its motherboard, which may discourage prospective purchasers from tak-

ing the plunge right away.

(This has major implications for the way AT&T will have to proceed. Either AT&T will be able to sell so many hundreds of thousands of computers that it can experiment with new non-IBM designs and features and force third-party vendors to adapt their IBM-specific products to

between Key Tronic and IBM in quality and ease of use, although its flimsy plastic shell makes it look like a toy beside the one from IBM. An external 10-megabyte hard disk is available, as is a crisp 640 × 400 color monitor with a gorgeous display, although the model *PC Magazine* managed to pry loose from a reluctant

The interior of the AT&T 6300. Of the seven expansion slots, two are socketed for 16-bit addressing. The color/mono graphics board is at the very left edge of the chassis. This configuration includes two half-height floppies; an internal hard disk is also available.



AT&T's "nonstandard" specs, or else AT&T will be stuck playing catch-up to IBM. AT&T is one of the only companies with the clout to try bucking the IBM tide, but good luck. It's a real gamble to go against the grain, since it only works if the number of sales is going to be astronomical, but just being different is so dangerous in the follow-IBM world of micros that many of the prospective sales may vanish *because* the difference exists. Similarly, if IBM slashes its prices, AT&T will have to drop its own. This phenomenon ties the fortunes of the entire MS-DOS world to the successes and failures of IBM.)

Lose Big

The keyboard sports winking Num-Lock/CapsLock LEDs and is somewhere

AT&T was the European version with "Continental" styling (read "bloated and hideous"). AT&T is putting the finishing touches on a far sleeker color monitor for the U.S. market along the lines of its svelte green screen. While the system will give you color or monochrome output from the single video port, you'll need a special card for 16-color, 640 × 400 dot-addressable graphics, available in the fourth quarter of 1984. Curiously, the monitor will not display any border color, so no matter how vivid the image, the screen will be edged in a stark, funereal frame. Put a pastel-framed PC monitor beside an ebony-edged AT&T and the PC looks far better.

The IBM PC's motherboard is located at the bottom of a well of add-on cards,

cables, and drives. Installing RAM or troubleshooting a defective chip means unscrewing the whole works and ripping into the innards. Even the simple process of resetting a DIP switch in a fully equipped PC-XT switch means confronting a thicket of cables, cards, and connectors that calls more for a machete than a screwdriver. Olivetti hung its main circuit board upside down at the very bottom of the cabinet. Adding RAM or just poking around is far less painful than on the IBM. And this opens up the main interior of the machine, which looks clean and sparse. As with the PC, there is room for 640K of RAM, but only 256K on the motherboard itself.

One feature that seems almost dangerous is a reset button on the front of the computer. While the switch is recessed and is not the easiest thing in the world to hit, it's possible to wedge a pencil or an eraser or other small object between the back of the keyboard and the system unit, make one small fatal move, and lose big. Frankly, I think if you're going to have to do a hard reset, you can reach around to the power switch. In any event, you can put your system unit on the floor (especially if you're using the hard disk version) for that uncluttered-executive-desk look. The 6300 also boasts a mouse hole and a small on/off light that you can't really see unless you scrunch down and stare at it. Sorry, AT&T, but these last few features are not substantial selling points. The only other real oddity about this thoroughbred is that in the dual floppy system PC examined, drive A: is on the bottom and drive B: on top. This takes a lot of getting used to.

The usual software best sellers are available for this system, including *1-2-3*, *dBASE II*, *WordStar*, *Multiplan*, *Word*, and a whole stable of Microsoft and Digital Research languages. AT&T is offering a wide range of third-party printers, including an inexpensive dot matrix trio from C. Itoh, a relabeled letter quality Qume Sprint, and a pair of letter quality Olivettis. Strung together, the keyboard, squat system unit, mono monitor, and any

one of the printers make a perfectly adequate workstation. But I wouldn't trade in your PC just yet.

Lost in the Mail

The fast clock and 16-bit bus juice up the speed of most popular applications by 16 to 30 percent. But what adds the most

**SOME
RATHER FLAMBOYANT
AT&T SALESPEOPLE
"FIELDSTRIP" A
6300 BEFORE A
PROSPECTIVE CLIENT
TO SHOW HOW EASILY
THE THING SNAPS
BACK TOGETHER.**

appeal to the 6300 is AT&T's reputation for high standards of quality and workmanship, and the company's technological prowess—especially in communications. Pick up a solid, well-made telephone and you're likely to see the familiar Western Electric logo; imitation instruments made by AT&T's scores of imitators feel cheap and tacky. And while the common perception today is that AT&T's monthly charges were higher than real competition would allow, the service was extraordinary. We take for granted the ability to punch in a number and find ourselves chatting with someone halfway around the world a few seconds later. As one wag put it, imagine if the U.S. Postal Service had run the nation's phones. . . .

AT&T's vast national sales and support forces and distribution channels don't hurt

its image either: 6,000 account executives now hawking phones will be flogging the 6300 and the whole 3B line, and analysts expect a large percentage of AT&T's more than 20,000-strong service arm to be retrained as field computer repair specialists. Remember, AT&T does make house-calls. Kenneth Bertaccini, Pacific Region ATTIS VP, put it this way: "I believe we have the greatest ubiquity of any service organization." You get the feeling that there definitely will be an easily remembered 800 number to call if you have a problem with your AT&T computer.

AT&T is offering maintenance agreements for software and/or hardware and feels the machine is so modular that users can snap parts in and out themselves. The disk drives are even spring-loaded to pop out into your hand. Some of the more flamboyant AT&T salespeople "field-strip" a 6300 before prospective clients to show how fast and easy the thing comes apart and snaps back together. You're supposed to mail your broken parts to a regional service center, which can take several days, but if you can afford it, AT&T will sign you up for its red carpet service where a phone call to a national hot line will produce a replacement part within 24 hours.

The Promised LAN

It's in networking that AT&T gives most other computer vendors the biggest Maalox bills. The company that invented the transistor, has its wires in the walls of nearly every home and office in the country, and boasts a worldwide transmission and switching system beyond compare is in the perfect position to tie everyone's terminals together. And, in fact, it has already started. Vigilante admits his company's products were all designed with each other in mind: "This we believe is our forte. . . . We understand how to link things together."

AT&T's electronic rete, called Information Systems Network (ISN) and based on its proprietary Information System Architecture, is in production in small

quantities and will be generally available by the end of the year. According to Vigilante, ISN is a general-purpose LAN using short-bus packet switching that "marries the strengths and avoids the weaknesses of star, bus, and token ring systems [the method formerly used by IBM]." However, IBM's sophisticated new PC Network, which can carry video as well as voice and data and will be available at about the same time as AT&T's, is a formidable competitor that may steal AT&T's ISN thunder.

Built around the new AT&T Model 100 packet controller, which transmits at speeds up to 8.64 Mbps and switches 48,000 packets per second, the system is said to be virtually collision-free, which means users won't have to wait unnecessarily if the system is busy. Each controller can tie together over 1,900 async ports, and the controllers themselves can be daisy-chained via optical-fiber trunk lines, yielding networks of enormous size. Another AT&T device called an ISN Concentrator can plug into the Packet Controller and link 40 terminals and personal computers over ordinary four-pair copper wire rather than expensive coaxial cable; this mini network can be located up to a mile away from the main controller, and individual terminals can be as far away as 2 miles from the concentrator, giving new meaning to the word "local." Each connection will normally cost \$400 to \$500, or less if the quantity warrants.

AT&T also announced four protocol converters: asynchronous ASCII to SNA 4276, and ASCII to bisynchronous 4271, 5274, and 5776, all priced between \$2,900 and \$4,900. Since these and other protocol converters built into the ISN LAN can allow asynchronous terminals to talk to synchronous IBM systems, many LAN-watchers feel that AT&T is gunning for the IBM world, with a particular bead on future 3270 installations.

The verdict on ISN has generally been positive, even effusive, although most observers admit it is far from state-of-the-art. Still, AT&T 6300 users can be up and

interconnected without having to wait 2 or 3 years and can tie into vast webs of other DOS and UNIX computers miles away.

Two new communications software products of special interest to many prospective personal computer buyers are AT&T's *PC Interface* and *Context Switch* programs. The former lets 6300s, IBM PCs, or any compatible MS-DOS machines tie into a central 3B UNIX host

ON ISN THE VERDICT HAS BEEN POSITIVE. AT&T 6300 USERS CAN INTERCONNECT AND TIE INTO VAST WEBS OF OTHER DOS AND UNIX COMPUTERS MILES AWAY.

computer and automatically performs the appropriate file conversions to give DOS users access to the UNIX hard disk. And it lets your very own PC become a 3B remote workstation.

The latter, with a third piece of AT&T software, allows 6300s, IBM PCs, or PC-compatibles to act like AT&T 4410 dumb terminals and lets users switch back and forth between standalone DOS operation and UNIX terminal emulation simply by tapping three keys. Even if they're in the middle of an MS-DOS application, users can log onto large 3B databases, pull in the information they need, and then process it independently with DOS software packages. The *Context Switch* freezes the DOS application as it switches to UNIX and,

when it later returns control, brings up the exact same DOS screen that was displayed before the interruption, even putting the cursor back in the same place. AT&T compares this software to a computer "hold button" and feels that by the end of the year half a dozen third-party manufacturers will offer similar packages.

Analysts expect AT&T to fill the empty expansion slots with communications features, such as a board that handles both data and normal voice communications. But even with such a device in place and a memory board or two, there is still plenty of room for other interesting add-ons, particularly in the graphics arena. AT&T is determined to emphasize graphics, and one spokesman suggested we may soon see a flurry of impressive proprietary graphics software and digitizing hardware.

Good-Bye, Columbias

The emergence of AT&T as a strong competitor to IBM should bring about a broad restructuring of the existing market. Computer stores, wary of the evanescence of smaller suppliers and not wanting to become overdependent on IBM, are openly welcoming AT&T as a strong competitor with marketing savvy and staying power.

But this could be the death knell for many in the compatibles industry, even those with decent, workmanlike products. Dataquest's Kenneth Lim feels that AT&T's entry "signals the beginning of the end for the little guy, [who] can't match the tremendous resources of the giants," echoing that the initials on the case are more important than the circuitry inside. "The game has leveled to distribution and marketing," according to Lim. "Plenty of machines outperform IBM . . . and they'll never make it big. Because it's simply how much you have in your pocket to spend on advertising and distribution and how long you can hold out until your competitors die away. . . . Every multibillion-dollar, multinational company that gets into the business guarantees the death

of ten of the little guys." International Data Corporation's Aaron Goldberg agrees, citing among the likely victims "the second and third tier companies—the Eagles, Coronas, and Columbias—that are struggling for shelf space."

Most experts feel AT&T will move only 30,000 to 60,000 6300s this year, since the sales push is just gearing up. The long-range outlook is rosier. John Kiefer, an InfoCorp analyst, sees AT&T hitting the 300,000 level by the end of 1985, although most other critics are much less sanguine. Several dealers have already taken the plunge; you can pick one up at the AmeriSource, ComputerLand, CompuShop, Genra Group, Sears, or MicroAge outlet nearest you. Also said to be involved in distribution are BusinessLand, Entre Computer Centers, and United Telecommunications. These and others yet to be enrolled should account for 60 percent of all sales, according to an AT&T source; the remaining 40 percent of orders will be rung up by AT&T's own direct sales force.

You won't be able to place an order for a 6300 at your local AT&T Phone Center store. A senior AT&T executive explained that the stores "are mostly designed, staffed, and located for housewives to come in and pick a new color for their phones. The store personnel there are 'nonmanagerial' clerks barely able to take those orders. And the stores are all in the wrong parts of town. If and when AT&T decides to set up a chain of its own stores, we'll do it properly, with well-trained salespeople, ample support, and choice locations."

AT&T will spend \$20 million on television ads through the end of this year, according to Yates Ventures, and \$10 million elsewhere. (The *New York Times* says the figure is closer to \$40 million.) Two kinds of ads are planned: one that pushes the family of AT&T computer products and the flexibility and power of the network, the other that features individual products such as the 6300. In any event, the New York execs nestled in the top floor of Philip Johnson's Chippendale

THE TECHNO-INNARDS

The PC 6300's processor speed seems to be its chief difference from—and advantage over—the PC.

The PC 6300 performs. Our tests bear out AT&T's claims of "50 to 80 percent faster." Here's a peek under the hood to show you how it's done.

The biggest contributor to its speed by far is the 8086 clocking along at 8 MHz. The 8086 addresses the 256K of on-board memory via a 16-bit data path. The disk controller circuitry is also on the motherboard, giving it 16-bit access to memory via the DMA controller. This access provides a theoretical advantage, but not one we were able to measure.

The PC 6300 motherboard, except for a graphics or character display controller, is a complete computer. If the application required a serial terminal instead of PC compatibility, it wouldn't need any add-on cards. The PC 6300 does have a PC-compatible bus, using some multiplexing circuitry to make it look like the PC.

While the IBM's bus runs at the same 4.77-MHz speed as the rest of the system, the AT&T machine simply halves the processor speed of the main board for easy interfacing. The bus runs at 4 MHz, driven by its own oscillator.

We wondered if the difference in bus clock rates would be measurable. Our first experiment was to put in a memory expansion card. It operated normally, without fuss or fanfare. We then set up two RAMdisks, one in the PC 6300's "native" memory, the other in the expansion card.

Given the layers of code that the RAMdisk has to slog through (MS-DOS, BIOS, drivers), we weren't sur-

prised to find no measurable difference between the 8-bit and 16-bit RAM drives. AT&T has promised a full 16-bit memory card that plugs into the extended data bus on the motherboard. It can't hurt, but it doesn't seem to matter.

The other area in which clock speed

**THE PC 6300
PERFORMS. BY
FAR THE BIGGEST
CONTRIBUTOR TO
ITS SPEED IS THE
8086 CHIP
CLOCKING ALONG
AT 8 MEGAHERTZ.**

could make a difference is with a fast peripheral, such as a hard disk. We tested the read/write time of an add-on hard disk on the PC 6300 and a regular PC. Again, we found no detectable difference in speed, other than those that were attributable to the clock rate.

The processor speed seems to be the PC 6300's ace in the hole, borne out by our measurements on the Compaq Deskpro. It, too, sports an 8086, but is clocked at 7.14 MHz (exactly double that of the PC), for greater compatibility with older PC programs that were sensitive to clock speed. The Deskpro tested slower than the AT&T, despite the full 640K of 16-bit addressable memory on its motherboard. (See "All-Weather Fighter: The Compaq Deskpro, Model 4" in this issue.)—Bill Machrone

mistake are serious players.

Who Are Those Guys?

Okay, so AT&T is just recycling a European computer with a 7-year-old chip. The machine is a performer. But so is IBM's astonishing new AT. What's really impressive is the speed at which AT&T is proceeding. The company was allowed to enter the micro market less than a year ago, and it's already closing in fast on the leaders. The 3B family, 6300 PC, and ISN network are all part of what AT&T calls its "blueprint for the future." This plan presumably calls for voice and data integration, micros chugging away under UNIX (probably with a friendlier shell), superior graphics, and hardware and pricing that challenges IBM dominance, all neatly tied together.

So AT&T and IBM will probably end up alternately leapfrogging each other over the next few years, while they devour the lesser competition like flies. It's just a sign of the times. The veneer of glamour, the mystical feeling that this is all new and exciting and that only wizards can make the magic work is ebbing. Micros are indeed powerful tools, far more so when hooked to other micros and larger computers. But the same can be said of telephones, and there's little fuss over these important voice terminals.

Somehow my money's on IBM. True, if anyone has the resources to muscle IBM out of the picture, it's AT&T. But I don't think it will happen. For one thing, IBM is too smart, and it has a decent head start. For another, AT&T may have some of the best top management around, but lower down the ladder the personnel is—to be charitable—spotty.

This review was originally going to be just a photocopy of my phone log of 44 beat-your-head-against-a-wall calls to the public relations and marketing departments at AT&T, each one a long and aggravating waste of time as I spoke with increasingly incompetent drones in a futile effort to get the information I needed to write the article, followed by a stern

admonition: DON'T TOUCH THIS COMPUTER WITH A TEN FOOT POLE! However, I finally managed right at my deadline to get through to one of the top guns, who turned out to be a real winner—extremely intelligent, sharp as a tack, courteous, and thoroughly helpful, in stark contrast to just about everyone else

IBM DOES THE IMPORTANT THINGS RIGHT, LIKE ITS BASIC, ITS NONPAREIL KEYBOARD OR ITS POLICY OF REPLACING OLD PARTS WITH NEW ONES, NO QUESTIONS ASKED.

with whom I spoke.

This top exec chalked up my travails to the novelty of this line of business: "Our public relations department is not really accustomed to dealing with the press the way we now have to. The whole company has to change its outlook." This former monopoly became very fat with its guaranteed profits and its awesome power on the American scene. As Lenny Bruce put it, "They can do anything. They're the phone company. Screw around with them, and you're stuck with a Dixie cup and a thread." Anyone who lives in New York and has ever had any kind of phone trouble knows about the agony involved in setting it straight. Before AT&T makes a serious run at IBM, it's going to have to shed an awful lot of those public-be-damned attitudes. It'd better hurry.

The idea of an open system is wholly alien to a company known for keeping its cards close to its chest. This is the same company that used to recoil in horror if you touched a screw on your telephone, or—God forbid—hooked up someone else's equipment without its blessing. According to 6300 Product Manager Ed Cote, AT&T is making a serious effort to change. But there are limits. The architecture was designed open, but only reluctantly. If you want to see the technical specs, for instance, you have to fork over \$500 for a technical reference manual and systems programmer's manual.

You probably wouldn't go too far wrong buying an AT&T 6300 if all you want to do is run *1-2-3* or *WordStar* all day. It, and the other 8086, 80186, and 80286 sprinters get the job done. I'm sticking with IBM. It just does the important things right, like its nonpareil keyboard, top-of-the-line built-in BASIC, or its maintenance policy of ripping out the old parts and handing you new ones, no questions asked. IBM's personal computers are far from perfect, but so far nothing has come close. The PC AT is an awesome micro, and all sorts of interesting IBM hardware is reported to be in the works.

The real question is what happens next for the serious user market. If AT&T does concoct some sort of exotic 32-bit UNIX-driven computer/phone with a friendly shell and awesome graphics that runs all my old applications and opens the door to exciting new classes of ultra-powerful software, I'm all ears. But by then IBM will have something pretty spectacular too. Then there's Apple, but remember I said *serious* user. The old compatibles market will be just a fading memory.

It was bound to happen. The two giants should give each other enough competition to make it all interesting. The 6300 won't dethrone IBM, but if your heart is set on buying a compatible rather than the real thing, you won't be too disappointed. Still, it's simply the nose of a very large camel peeking under a Big Blue tent. ■

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BASF

ITT's XTRA is a PC clone that deviates little from IBM's design, except in its keyboard layout. Quality control failures make it hard to recommend.



COVER STORY • CRAIG L. STARK

NOTHING SPECIAL
THE ITT
XTRA



Many Fortune 500 companies today suffer from the compulsion to market their own PC-compatible microcomputers. Thus ITT's announcement earlier this year (see *PC*, Volume 3 Number 2, page 41 and Volume 3 Number 13, page 45) of its XTRA Personal Computer came as no great surprise.

The XTRA review sample I received was the color version of the ITT XTRA Model II. It comes with dual floppy disk drives, 256K RAM, and a 32K ROM containing the power-up, BIOS, and monitor diagnostic routines. The \$3,425 package includes a color adapter card and a 12-inch Princeton Graphics RGB monitor, a Key Tronics keyboard, and MS-DOS 2.11 with



ITT XTRA

ITT Information Systems

P.O. Box 52016

Phoenix, AZ 85072

(800) 528-1400

Model I (128K RAM, one 5¼-inch floppy disk drive)

List Price*: \$2,495 with monochrome monitor, \$2,925 with color monitor.

Model II (256K RAM, two 5¼-inch floppy disk drives)

List Price: \$2,995 with monochrome monitor, \$3,425 with color monitor.

Model III (256K RAM, one 5¼-inch floppy disk drive, one hard disk)

List Price: \$4,995 with monochrome monitor, \$5,425 with color monitor.

Model IV (640K RAM with real-time clock, one 5¼-inch floppy disk drive, one 10-MB hard disk, additional parallel port)

List Price: \$5,695 with monochrome monitor, \$6,125 with color monitor.

*Prices include monitor and adapter card, keyboard, one parallel and one serial port, DOS 2.11 with Advanced BASIC, and memory and disk drives as indicated.

CIRCLE 784 ON READER SERVICE CARD

advanced GWBASIC. (Other models and prices are shown in the Fact File accompanying this article.)

The XTRA is not prepossessing on the outside. Its beige system unit, which measures 14 inches wide by 15½ inches deep by 6 inches high, has a distinctly boxlike shape that recalls a 1970-vintage Norelco tape recorder. Although its relatively small footprint is welcome on a crowded desk, it looks overwhelmed when topped by its larger (14¾ inches wide by 15½ inches deep by 11 inches high) color monitor and fronted by its 18-inch-wide keyboard.

Opening the case (only two screws—IBM, take note) reveals a neatly laid-out Qume motherboard. The motherboard has five 62-pin PC-compatible expansion slots; their rear covers use the same size screwheads (IBM, are you listening?). The XTRA's switching power supply is rated at 128 watts (the equivalent of that used in the PC-XT), and you can easily remove the supply box for servicing (using the same nutdriver, IBM). If you're accustomed to old-fashioned, nonswitching power supplies, the capacitors inside the supply box may look a little skimpy, but the system is rated for the same ½-cycle AC power loss before reset as the PC-XT. The two half-height drives are manufactured by Qume, a subsidiary of ITT.

Designed Like the PC

The chip set is identical to that of the PC, with an 8088 CPU (there's a blank socket for an 8087 coprocessor), an 8288 bus controller, an 8237 direct-memory access controller, an 8259A interrupt controller, and an 8284 clock generator. You derive the 4.773-MHz clock rate for the CPU by dividing the 14.31818-MHz oscillator frequency by 3, as with the PC. Unlike in the PC, the motherboard itself (not simply plug-in adapters) includes both a serial and a parallel output port. These two ports use an 8250 async controller and an 8255 parallel interface, respectively, à la the PC. The XTRA uses an 8272A (Intel's number for the NEC

uPD765) for its floppy disk controller, as does the PC. Both the monochrome and color adapters use a Motorola MC6845 CRT controller. The XTRA's system memory allocations, including the 4K mono and 16K color limitations, are the same as those for the PC.

In view of the overall design similarities between the XTRA and the PC and its use of MS-DOS, it's no surprise that the XTRA ran PC software, including Microsoft's *Flight Simulator* and Lotus's *1-2-3*. The fact that our *Norton Compatibility Checker* returned an index of 1.0 is not surprising either. IBM BASIC programs using PEEKS and POKES will not run on the XTRA, of course, because of memory address differences with ITT's GWBASIC. (And no clone can run such BIOS-specific programs as IBM's diagnostics.) Otherwise the XTRA is functionally compatible with the PC.

Quality Control Problems

What troubled me about the XTRA was not its design. Indications of less-than-satisfactory quality control during manufacture, however, did worry me. After I booted the machine, I looked at the directory of the DOS disk. I was surprised to find at the top and bottom of the display that the letters were pulled out toward the corners by more than the width of one full character. At first I thought that the monitor might have been damaged during shipping. (The first keyboard had been crushed in transit.) So I asked for another monitor, which ITT cheerfully supplied immediately. The second monitor, however, displayed the same italic (lower corner) and reverse-italic (upper corner) optical aberration. When I called ITT again, I learned that the deflecting magnets on the entire shipment of Princeton Graphics monitors apparently had been glued on incorrectly. Yet no one in quality control had caught the obvious problem.

My concern grew when I found that the A: drive behaved erratically, sometimes even refusing to boot from copies of its own DOS. I checked both drives with a

ReadiScope disk-drive tester. The A: drive tolerated noncircular tracks inconsistently. The wide variations in repeated runs led me to conclude that the drive itself was the source of the eccentricity.

Even easier to spot was the fact that both disk drives were running at 335 (or 334) rpm, not at 300 rpm. The speed tol-

keys, typewriter keys, and numeric keypad—are the same as those of the PC.

Ever since IBM violated the Selectric standard for keyboard layout by placing the PC's left Shift and Return keys where no American-trained typist could find them without thinking (the criterion of touch typing), makers of PC clones have

bothers you, the XTRA's "improvement" won't help you much.

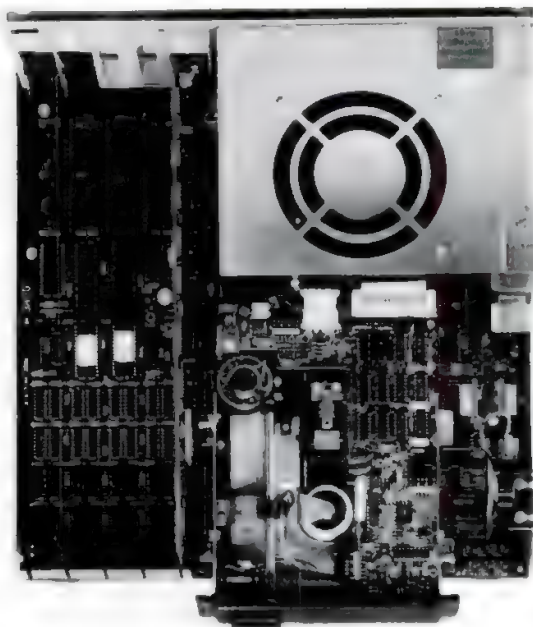
Soft Touch

The other disconcerting aspect of the ITT keyboard is its touch—an aspect of the PC that rates a gold star. Although the overall keystroke travel of the XTRA and the PC keyboard is roughly the same, you trigger the XTRA's keys with only about half the force needed to activate the PC's keys. Young data entry operators apparently welcome this ease of depressing the keys. Rapid touch-typists, used to typing with a slightly heavier hand, however, find all too often that they accidentally trigger a smattering of characters, reducing their accuracy and slowing their speed. And I think the snappier action of the PC's keys produces a far more reassuring feeling (and sound) than that of the XTRA's too-easy-to-depress keys.

On the Credit Side

The XTRA is not entirely without good points. The smaller pixel size (0.31mm-dot pitch) of the Princeton Graphics monitor, which of course you can align properly, is a distinct improvement over the standard IBM RGB. But the alphanumeric character set (8×8 dots) and the restricted color palette are the same as in the PC. The XTRA faithfully repeats the color and sound restrictions of the IBM PC. Sections 7 and 8 of the ITT BASIC manual, which explain advanced graphics and sound generation, are acknowledged reprints from *Your IBM PC* by Lyle Graham (Osborne/McGraw-Hill). However, some sections of the XTRA's DOS manual and nearly all of its *Technical Reference* manual are far more clearly written than the corresponding PC documentation.

But when all is said and done, the only extra I found in the XTRA was its price. Yet a comparably equipped PC is not much more expensive. Perhaps discount retailers will push the XTRA at a substantial savings over the PC. For now, however, I don't think the XTRA is an attractive alternative to the real thing. ■



The XTRA uses a Qume motherboard, and the power supply box can easily be removed for servicing.

erance should be ± 5 rpm on this test. Since the drives are servo-controlled, part values that are not able to achieve a center frequency of 300 rpm found their way into both drives. But no one at Qume or ITT caught the drive speed error, which exceeded 10 percent. This type of quality control is unacceptable.

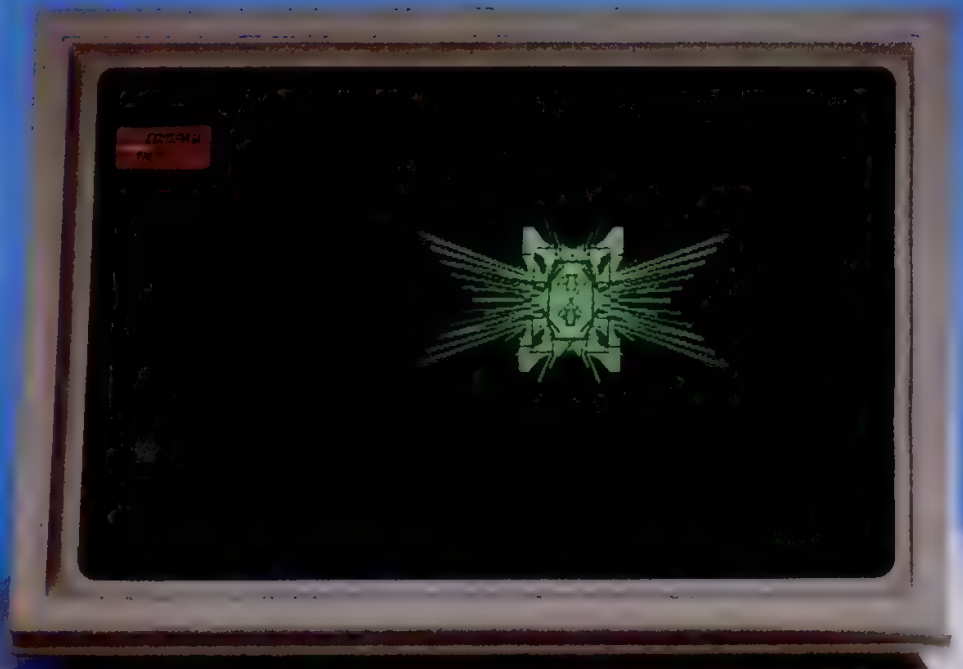
Keyboard Woes

Certainly no aspect of a computer's design is more important than its user interface, the keyboard. The XTRA keyboard uses a Key Tronics design with 83 keys. Two of the keys, CapsLock and NumLock, have the desirable LED status indicators IBM should have included in the PC. The major groupings—function

had to choose between the new and the old key placement. ITT decided to adopt the "quick fix" of the first (now superseded) Key Tronics alternative keyboard; it interchanged the backslash (\) and the left Shift keys and moved the open single quotation mark (') key up a row, leaving room for the Return key on the home-base row.

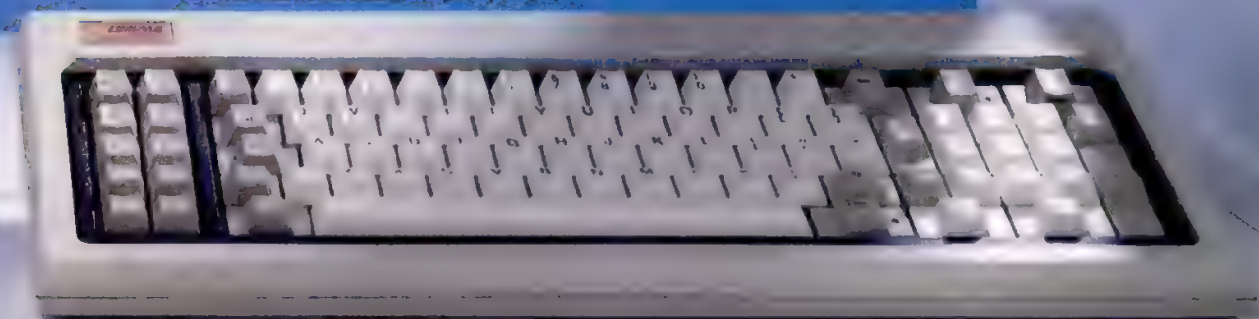
Two factors limit the success of this solution. First, in the Selectric layout, the center of the left Shift key is slightly to the left of the position of the PC's backslash (\) key, and so errors still occur during rapid typing. Second, the Key Tronics quick fix uses the same, undersized surfaces for the Shift and Return keytops as the PC; hitting them accurately is no easier. In short, if the PC's keyboard layout

The Compaq Deskpro takes on a jet-like image by providing more firepower than the IBM PC at twice the speed. It takes the roughest conditions in stride and gives you a feeling of true invincibility.



COVER STORY • BILL MACHRONE

ALL-WEATHER FIGHTER
**THE COMPAQ
DESKPRO,
MODEL 4**



Flying a desk'' is how Air Force types wryly describe command duties that keep them out of the cockpit. But the phrase takes on a whole new meaning when the desk in question is equipped with a Deskpro. It's an F-14: a data-superiority fighter for the desktop.

The Compaq Deskpro provides the performance and firepower you need to undertake the tough missions and come back in one piece. Need speed? No problem. An 8086 clips along at Mach 2—twice the speed of the PC. Payload? You bet. It offers 640K RAM and 10 megabytes of hard disk. Backup systems? Roger. A tape drive packs all of its 10 megs onto a diminutive DC-1000 cartridge. Electronic countermeasures? Yessir. A wealth of Compaq experience and a frequency-agile system clock ensure compatibility for existing software. Maneuverability? Affirmative. The dual-mode monitor emulates either the PC monochrome screen or PC-standard color graphics. In addition, the two half-height drives provide you with maximum flexibility for older, floppy-bound programs.

The full-house Model 4 is the machine described above, and it's the one to buy. It costs more than a PC, but it also does more. Even IBM's PC AT doesn't have a built-in tape drive. The lower-order Deskpros share the Model 4's processing speed but come with only one or two floppy disks and no tape. All are upgradable to the Model 4, but if you currently need these capabilities, you might as well start at the top.

The "power user" has been getting a lot of attention these days, from the press,

software manufacturers, and now from hardware manufacturers. The Deskpro is made to order for the new generation of high-demand integrated packages, databases, and graphics programs.

Inside Out

From the outside, there's nothing arresting about Deskpro's appearance. Its dimensions are roughly the same as the PC's, with the styling and trim of the Compaq portable. According to Compaq, the keyboard retains the familiar IBM layout, mainly because of the preponderance of existing documentation geared to it. But the keyboard feels different. Gone is the two-levels-of-mush design. The new keyboard uses the Advanced Input Devices rubber dome technology for a nice over-center feel, virtually identical to PCjr's born-again keyboard. Overall, the feel of the keyboard is pleasant, but it could benefit from larger keytops on the often-used Return, Shift, Tab, Backspace, and Ctrl keys. The space bar is hinged at the edge nearest you and tilts as you depress it. Its action is somewhat inferior to keyboards using a compensator bar (a lever arrangement under the key) for truly vertical motion. For further improvement, Compaq should offer a word processing layout based on the Selectric, especially in light of the PC AT's keyboard.

Despite the tactile feedback, the keyboard is virtually silent except for an electronic "click" or chirp to give you some audible feedback. The volume level is controllable from the keyboard by pressing Ctrl-Alt-Plus or Ctrl-Alt-Minus. The keyboard plugs into the front panel, and the coil cord is far more flexible here than on the Compaq portable—a welcome step forward. Deskpro's keyboard has a two-level height adjustment, and rubber feet keep it from getting away from you.

Preflight Inspection

The machine's innards follow the usual PC layout. A large, slow-turning fan stirs the air, keeping the noise level quite tolerable. If you poke around, you see the usual

complement of cards plugged into the motherboard, until it strikes you that something's missing: the tape controller. If you trace a ribbon cable, you'll find it runs off the floppy disk controller. While some tape industry gurus say Compaq's methodology cuts corners, others applaud the economy of design.

On the motherboard itself, there are lots of Compaq-proprietary gate array chips. They reduce the overall chip count and provide some of the subtler elements of compatibility that Compaq believes is so necessary to this machine. The memory is all on the motherboard—all 640K of it. It's easy when you use state-of-the-art 256K chips.

There are eight expansion slots, only one of which is not full-length. The left-most socket nestles under a metal brace, so you must remove a screw in order to get at it. Incidentally, every single screw on the Deskpro has a Torx head—the kind you usually encounter when the label says, "No user-serviceable components inside." The manual goes on and on about how to stuff RAM, put cards in, and change the DIP switches, but Joe Average won't be able to find the right screwdriver at his local Sears store, much less in his desk drawer, to even open the case. Otherwise, the Deskpro is as nicely engineered and constructed a machine as you could want.

Ready for Takeoff

In action, the Deskpro is completely familiar because of its similarity to the PC. You power on, and it boots from the hard disk. The power-on LED flips from green to red to green again as the machine goes through its preflight checkout. Green means the processor is running at 7.14 MHz; red indicates a full-compatibility 4.77-MHz mode. Evidently, there are still some programming backwaters in which they use delays based on the processor speed rather than using the PC's timer interrupt. When you speed up the clock, the program should simply run faster, but badly written communications programs



Compaq Deskpro, Model 4

Compaq Computer Corp.

20333 FM149

Houston, TX 77070

(713) 370-7040

List Price: \$7,195

CIRCLE 713 ON READER SERVICE CARD

just stop working. Compaq didn't want to disenfranchise such programs (though they deserve it). You can change the clock rate from the keyboard simply by pressing Ctrl-Alt-Backslash, which toggles you

Since a standard Compaq portable can execute the same loop in 11 seconds, I attribute some of the speed gain to improvements made to GWBASIC, the generic equivalent of BASICA.

quiet, although the typical "graunchy" sound may startle you if you've never heard it before. The tape's high-speed rewind remains true to Deskpro's jet image—it emits a turbine-like whine.

It takes 16 minutes to format a new cartridge. For convenience, the software puts a "minutes remaining" bar chart at the top of the screen. Once a minute, it updates the chart and shows you the remaining time, like the big clock drive-in theaters used to run during intermission. You can back up all files, entire directories, or individual files. When you give the BACKUP command, the Deskpro looks at the tape to see if there are files on it. File backup is a speedy 3 minutes per megabyte, including a verification pass. Moreover, when you back up your disk, the TAPE command looks at your hard disk and the file specs you gave (if any), calculates the time required, and puts it up on the bar chart.

Like the COPY command, the TAPE command lists files to the screen as it copies them, and with impressive swiftness. The backup software is easy to use. If the tape you are using has files on it, it cautions you that the backup you are about to do will overwrite the existing files. There is no provision to append files to an existing tape. You can list a directory of all files on a tape, but it takes nearly as long to do this as to transfer the files. Since files are written sequentially, the Deskpro must read them all, searching for the mark that tells it there are no more files.

Deskpro is every bit as compatible as Compaq says it is. The software we tested—*Framework*, *Symphony*, *1-2-3*, project managers, word processors—and databases—ran without a hitch. The Deskpro takes rough conditions in stride. It's an all-weather fighter. But unlike its airborne equivalent, you don't need a million-dollar education to use it.

Is the Deskpro for everybody? Not at its current price. You don't use an F-14 when a Cessna 150 will do. But when the chips are down, I'll take power and speed every time.



The interior of a Compaq Deskpro, Model 4. Note the shock-mounted tape and disk subassembly.

between fast and slow mode.

One of my seat-of-the-pants tests that I use to check the speed of an MS-DOS machine is a simple loop in BASIC:

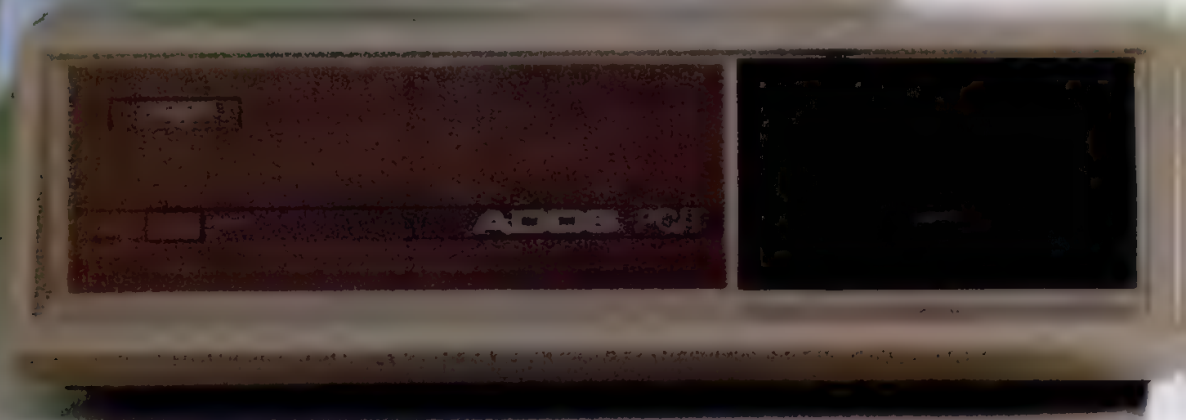
```
10 x$ = time$
20 time$ = "0"
30 for x = 1 to 10000
40 next x
50 print time$
60 time$ = x$
```

All it does is count to 10,000 and use the system's time-of-day clock to report how long it took. The Deskpro knocks off this loop in 5 seconds, just as fast as IBM's PC AT. A standard PC takes 13 seconds.

The setup and operation of the Deskpro, like a good airline flight, were uneventful. Unfortunately, the FORMAT program still contains the Microsoft bugaboo of blithely letting you reformat the hard disk by accident. It's appalling that any manufacturer, including IBM, accepted the program in this condition without doing anything to correct it. Otherwise, the machine does what it claims—emulate the IBM PC as closely as possible. Compaq's DOS documentation is better organized, so you'll have an easier time of it if DOS is new to you.

The Deskpro's distinguishing feature is its tape drive. In practice, it's quick and

The PC/I passes the tests for compatibility with the IBM PC. Moreover, the PC/I bests the PC's dBASE boot and sort test times and formats a disk, with and without system transfer, faster.



COVER STORY • STEPHANIE STALLINGS

MAKING THE GRADE

THE ADDS PC/I



The press announcement boldly states that Applied Digital Data Systems's PC/I is fully compatible with the IBM PC; no hemming and hawing here. The PC/I lives up to these claims: it's a straightforward PC clone with nothing unusual about it. What is unusual is that the machine is one of two PC-compatible computers marketed under the aegis of NCR Corporation, of which ADDS is a subsidiary. NCR is targeting its own personal computer, the NCR Model 4, for the retail market (see "Not a Cash Register: The NCR PC Model 4," in this issue, while ADDS is directing the PC/I mainly toward corporations and industries.

The PC/I gives ADDS, an established, major domestic producer of terminals, a foot in the door in the intelligent workstation and network market, according to a company official. And at \$2,650 for the system unit, two floppy disk drives, monochrome monitor, keyboard, 256K RAM, and a graphics adapter board, the PC/I may give ADDS a whole leg up into the single-user and small business market as well.

What You See

The PC/I, dressed in familiar beige, is approximately the size of the IBM PC and is made in Taiwan by Multitech. It comes with two 360K, 5¼-inch half-height floppy disk drives. The back of the unit carries the connectors and switches, including a serial printer (RS-232C) interface and a parallel printer (Centronics) connector.



PC/I

Applied Digital Data Systems, Inc.
100 Marcus Blvd.

Hauppauge, NY 11788
(516) 231-5400

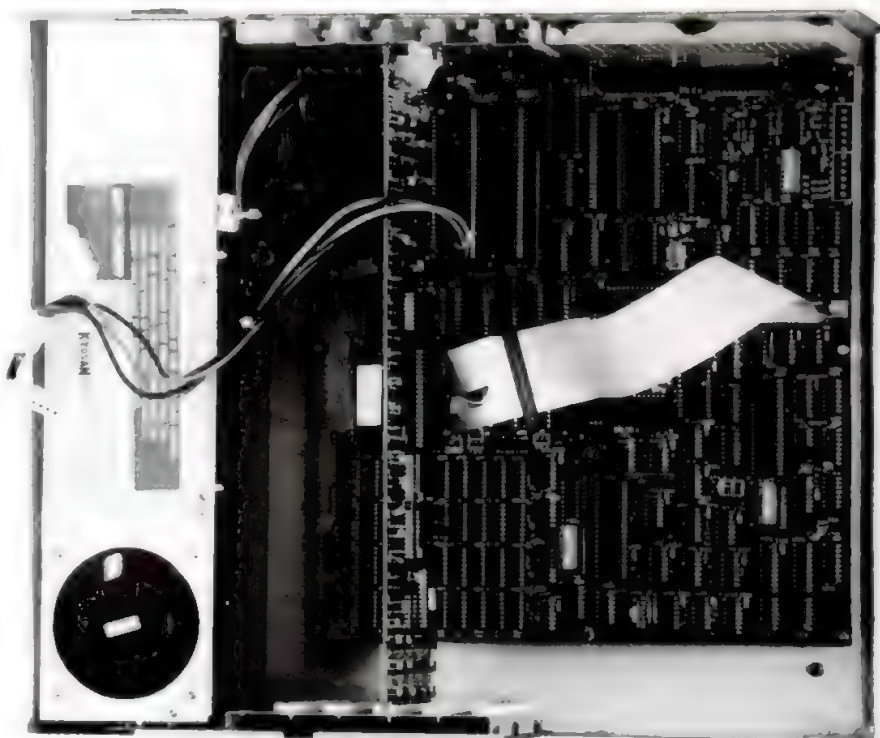
List Price: \$2,650 with 256K RAM, two 360K half-height drives, graphics adapter board.

CIRCLE 799 ON READER SERVICE CARD

The label on the monochrome monitor, which sits on a swivel neck, says "Demonstration Unit Only," but ADDS assures me that the model is bundled with the system and also that it is made by the company in Hauppauge, New York.

The keyboard has the ADDS sticker on the front, but turn it over and it says Key

the inside of the unit looks as roomy as an open field rather than like lower Manhattan at rush hour. This setup allows the drives to be changed without removing any of the cards and permits easy access to the motherboard. Unfortunately, the drives weigh down one side of the cover, making the replacement of the cover awk-



The inside of the unit looks roomy because disk drives are mounted underneath the cover to permit easy access to the motherboard.

Tronic. Some users find the Key Tronic touch too light, but others like the convenient indicator lights on the CapsLock and NumLock keys.

Removing the Wrapper

The system unit cover pulls off directly to the front. Just when I thought I had separated the casing and the chassis, I felt a tug, looked inside, and saw wires and a cable connecting the two like an umbilical cord. To my surprise, the disk drives are mounted on the underside of the cover, so

ward. You also have to pull the sides of the cover slightly apart to slide it over the frame.

The Matsushita half-height floppies are one of two or three brands appearing in the PC/I, but the company official to whom I spoke was unable to name the other sources. Aside from being suspended like hornets' nests, the only other unusual thing about the disk drives is that a portion of the ribbon cable connecting them to the motherboard is twisted, making the order of the pins different on the two ends. How-

ever, this difference isn't a cause for alarm because it merely reflects the differing pin configuration of the Matsushita drive. A plastic socket on the motherboard makes it easy to attach and detach the ribbon cable without straining it.

ADDs is preparing a second version of the PC/I, the PC/II, on which one of the half-height floppies will be replaced with a half-height, 10-megabyte hard disk. The PC/I could take a half-height hard disk in place of one of its floppies, but it would then need a separate disk controller card in one of its five slots.

Most of the PC/I's chips are the same as those in the IBM PC, including the 8088 CPU, a socket for the 8087 coprocessor, an 8288 bus controller, an 8237 direct memory access controller, an 8259A interrupt controller, a Motorola MC6845 CRT controller, and an 8272, or equivalent, floppy disk controller. A battery-powered clock chip is not included. PC/I's serial and parallel output ports are on the motherboard, whereas the IBM PC uses plug-in adapters. The serial port is managed by an 8251 async controller rather than by the 8250 used in the IBM PC, and the parallel port uses the 74LS374 interface instead of the PC's 8255. The PC/I's power supply is rated at 100 watts and is available for 60-hertz service at 115 or 230 volts.

ADDs supplies a 16K ROM for system use, but you can install another 32K. The PC/I, like the IBM PC, offers a fully populated motherboard containing 256K RAM. The PC/I's five expansion slots are all long enough and wide enough to hold full-length IBM PC boards. One of these slots holds the standard Multitech color/graphics adapter board, which allows the use of monochrome, composite color, and RGBI monitors as well as televisions as video displays, and it permits graphics on a monochrome screen.

One trade-off for using a color/graphics board is that its text resolution is poor. If you plan on doing an extensive amount of word processing, you might want to do your eyes a favor and install a plain-vanilla

monochrome card.

Powering Up

The speaker beeps twice and the disk drive squawks loudly every time you turn on the PC/I. The ADDs logo and the words "Power Up Self-Test" then greet you; this message can be reassuring or

PC/I'S SERIAL AND PARALLEL OUTPUT PORTS ARE ON THE MOTHERBOARD, WHEREAS THE IBM PC USES PLUG-IN ADAPTERS.

alarming, depending on your past experience with error messages. In an uneventful power-up, the phrase "Random Access Memory Bank 2" (or 3 or 4) is displayed as that area is tested. ADDs's technical support specialist explains that it would have been redundant to indicate that Bank 1 was functioning, because no Bank 1 means no messages.

If the self-test gets stuck, it displays the memory bank name, a one-line description of the problem, and then a suggested action. While this test is routine, the message sometimes overstates the situation. The first message trumpeted, "Keyboard error! Error condition found. Key 'F1' to continue." So I pressed F1 and nothing happened. Then I found out why—I'd neglected to plug in the keyboard. Another message shouted, "Booted diskette is not

a system disk." Translation: the disk drive door was open.

This message also indicates that, like other PC clones, the PC/I must have a system disk in order to boot. The PC/I does not have a honed-down version of BASIC in ROM, which is what the IBM PC will boot into without a system disk. Once the self-test is successfully completed, logos appear on the screen indicating the versions of the system software in use. The IOCS Version 2.11 is ADDs's answer to the IBM BIOS. The MS-DOS version the PC/I uses is 2.11, revision 1.04, or DOS+ for short.

Most of DOS+'s commands are the same in name and operation as PC-DOS's. Formatting a floppy disk without system transfer takes only 45 seconds on the PC/I, versus 108 on the IBM PC, and formatting with system transfer takes 81 seconds, versus 116 for the IBM. One difference is that you type GWBASIC (the name of the Microsoft version) rather than BASICA to bring up BASIC.

A reset button on the front of the cabinet is supposed to reinitialize the system if simultaneously pressing the Ctrl, Alt, and Del keys doesn't do the job, but the button didn't do anything on the machine I reviewed. I finally discovered I could solve the problem by reinstalling the screws on the back of the housing, forcing the reset button against the button on the power supply box. The reset button interrupts the 5-volt supply to the 8088, making for a much faster reboot than turning the computer on and off.

Is the PC/I Compatible?

This initial examination supported ADDs's compatibility claims for its PC/I, but the real tests were yet to come. One important requirement of compatibility is the ability to read the full IBM character set; the PC/I was quite at home with every code I tried. A run-through of the IBM standard diagnostics yielded only a system unit error 101s, which is to be expected of a machine that has a non-IBM BIOS.

(continued)

Another important test was the exchangeability of DOS disks. The PC/I and the IBM PC never suspected I had slipped them both a mickey when they booted from and listed the directory of one another's DOS disks and used one another's DEBUG and EDLIN programs.

The PC/I handles an IBM PC *WordStar* disk just fine; it booted the program in 6 seconds and completed the read test of a 10-page single-spaced document in a very fast 13 seconds (the IBM PC takes 31 seconds). The ADDS computer cut the IBM PC's *dBASE II* boot time of 6 seconds in half and bested the IBM's *dBASE II* sort test time of 82 seconds by 11 seconds.

The PC/I's times in other standard tests ranged from not-so-good to very good. Its sluggish result of 109 seconds in the prime number calculation (run in GWBASIC) doesn't measure up to the IBM PC's time of 66 seconds, but its times on the I/O tests—33 seconds for the write test and 18 seconds for the read test—were far more comparable. The Matsushita disk drives perform right on target, matching the IBM

PC's 300-rpm drive times.

The graphics adapter card makes it possible to run a variety of graphics software. *Flight Simulator* takes off, and Lotus's *1-*

THE PC/I CUT THE IBM PC's DBASE II BOOT TIME OF 6 SECONDS IN HALF.

2-3 looks pretty.

The PC/I's only odd behavior occurred when I loaded GWBASIC. I got the message "Parity error in main memory, system halted." ADDS's technical specialist

suspected a flakey chip and eagerly checked out both this problem and the faulty reset button when I returned the machine.

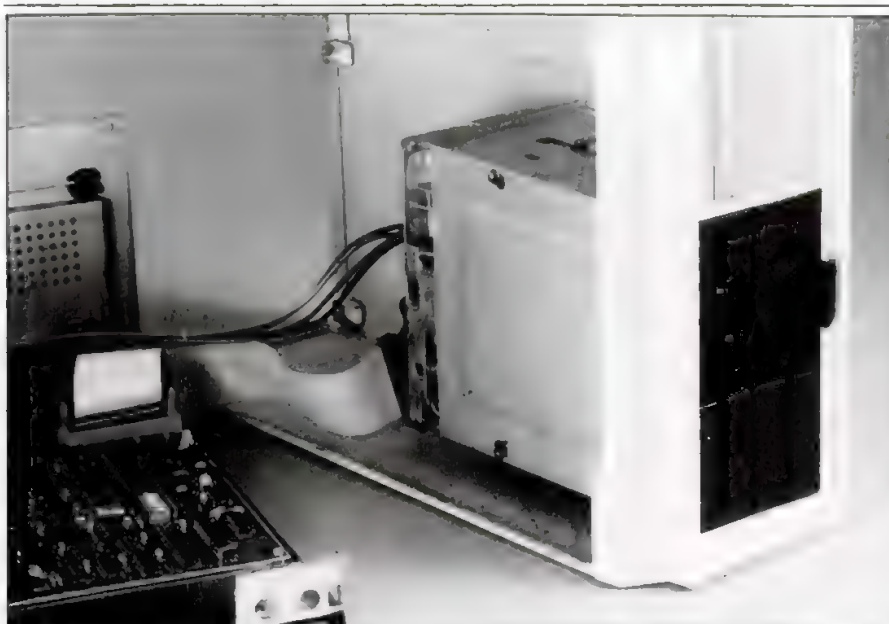
Meager Documentation

PC/I's documentation consists of a meager 60-page operations manual and a 3-page photocopied instruction sheet for installing the monitor. The operations manual concisely outlines the configuration of the system, how to install it, and the basics of operating DOS+, but it is hardly a replacement for a full set of manuals documenting all the details. A company representative says a complete user manual should be ready in late September and an elaborate on-line tutorial will accompany it.

You can reach the PC Support Group at ADDS through a special PC hotline, but if a technical person isn't available, you may be transferred several times before you find someone to take your message. Once I got through this inadequate telephone system, the technical person I spoke to promptly supplied the answers. ADDS is planning to release a diagnostic floppy disk as a separate software product and is talking about arranging extended service agreements.

The Survivability Factor

If this needed support is really forthcoming, the ADDS PC/I could be as comfortable to use as any other IBM PC look-alike. Moreover, ADDS's long history as a terminal manufacturer gives you further reassurance of the machine's reliability. Nonetheless, being an adequate IBM PC clone just isn't enough to ensure longevity in the select PC-compatibles' club; skillful marketing and a generous advertising budget are also vital prerequisites to membership. Can the PC/I survive the strenuous hazing it will undoubtedly undergo in the tough micro marketplace? Perhaps the answer won't matter if the PC/I can be the opening into the intelligent work station and network club for which ADDS says it's looking. ■



The unusual drive mounting system of the PC/I permits the drives to be serviced without disturbing any of its cards.

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For more information, call Orchid Technology at (415) 490-8586.

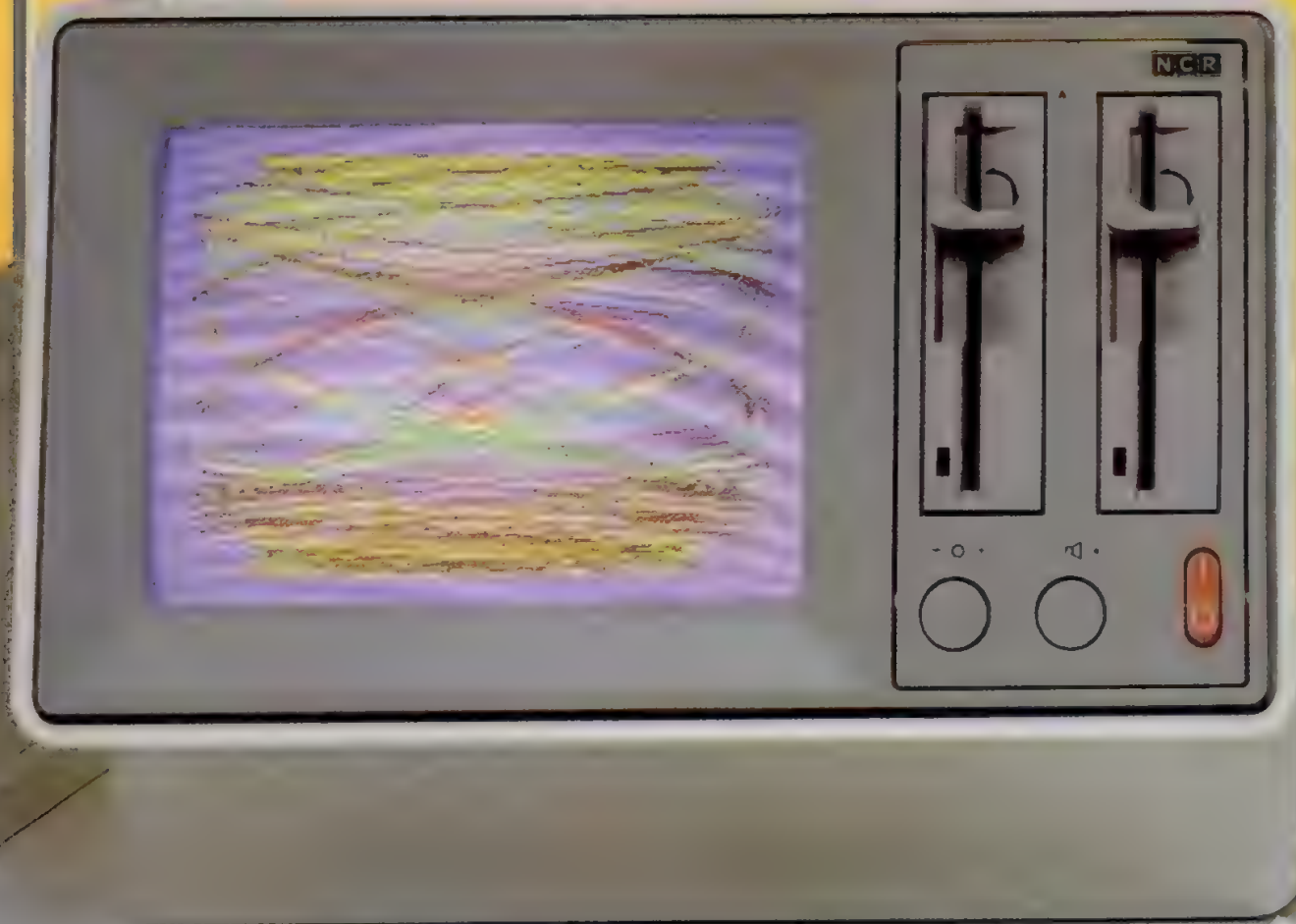
CIRCLE 217 ON READER SERVICE CARD



ORCHID TECHNOLOGY
47790 Westinghouse Drive
Fremont, CA 94539
(415) 490-8586 Telex: 709289

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With a century's worth of computing to its credit, NCR Corporation is cashing in on its reputation with retail stores and launching a personal computer that looks like a Lisa and acts like an IBM PC.



COVER STORY • DAVID OBREGÓN

NOT A CASH REGISTER THE NCR PC MODEL 4



he folks at NCR like to say they've been in the computing business for 100 years. They're right, of course. Few machines were more worthy of being called "number crunchers" than were NCR's classic all-brass cash registers or its 100-key, slot-machinelike adding machines. Just about every retail store in the United States rang up its sales on NCR registers, replete with bells, whirling gears, and clanking mechanical linkages that popped number cards into the little cage on top. Those things were Rockwell Americana.

Now, in the midst of the information age, we have forsaken those beautifully engineered mechanical marvels in favor of sleek, LED-equipped plastic boxes. All-brass, highly decorated cash registers and cumbersome adding machines are rapidly becoming mere curiosities, prized more for their aesthetic value than for their limited computing abilities. Faced with this new world, NCR rolled up its collective sleeve and came up with its own line of sleek boxes.

Following the industry leaders, NCR's new Personal Computer Model 4 uses the same technology as IBM's machine but packaged in a different form. The heart of the Model 4 is a garden-variety Intel 8088 brain, operating at a clock rate of 4.77 MHz (same as the PC's). There's a socket for the 8087 math coprocessor, and both a parallel and an RS-232 serial port are on the motherboard as standard equipment. Continuing the litany of features with a

familiar ring, you get 128K RAM as standard, although the motherboard can hold up to 256K total with more RAM available on a separate plug-in card for a maximum of 640K. The unit can be ordered with either a 12-inch monochrome or medium-resolution color monitor, and one or two half-height floppy drives or a hard

**THE
KEYS REACT WELL
TO A LIGHT TOUCH,
BUT THE FAMILIAR
REASSURING CLICK
IS MISSING, SO
THE OVERALL FEEL
OF THESE KEYS IS
MUSHY.**

disk built in. All for a slightly high list price of \$2,825 for the monochrome/two floppy drive unit. For the built-in color display, add about \$500.

Physically, the Model 4 resembles nothing so much as Apple Computer's Lisa. Indeed, more than one person passing my office as I wrote this turned around and did a double take, wondering what Apple's 32-bit machine was doing on my desk (and with a built-in color monitor, to boot!). NCR's chosen form is an elegant blend of traditional mainframe terminal designs (like that of the DEC VT-52s and the Hazeltines), the Lisa, and such all-in-one portables as the Compaq. The built-in monitor and drives sit on a 15- by 18-inch pedestal high enough above the desk top to free space for a Rolodex file and a telephone. The port/plug scheme used at the

rear of the system unit allows the Model 4 to sit almost flat against a wall without putting pressure on attached plugs (though the power cord's plug does prevent it from going all the way to the wall).

The power switch is on the front panel, a large orange rocker-type switch. Unfortunately, this switch (which should be recessed) juts out from the front of the case enough to ensure that you will on occasion find cause to hurl curses at the machine. It's too easy to shut off the Model 4 by accident.

Next to the power switch are two dial-type controls; one of these adjusts the built-in screen's brightness level. The other dial is—of all things—a *volume* control, a strange thing to put on a front panel considering the other controls that might have been placed here instead. For example, focus and contrast controls for the display are hidden inside the cabinet; they might have been more useful in front than the volume control. They would certainly be more accessible than in their present location.

I looked inside the machine and found a 2-inch speaker with an outsized voice-coil magnet, bolted to the motherboard where most computers have only a tiny button speaker. I suppose a speaker like this could very well justify a prominent volume control, if only to keep the system's various audible signals at tolerable levels. Still, is sound volume really the kind of thing you need to regulate often? I suppose if you expect to play a lot of noisy games in your office or plan to have the machine talk back at you (à la *Electric Dreams* or *War Games*), you'll probably find the volume control useful. Otherwise it's a waste of space, a case of "bells and whistles" taken literally.

A Flyweight Keyboard

The Model 4's 95-key detached keyboard (made by the Cherry Keyboard Company of Waukegan, Illinois) is 2 1/4 inches longer than that of an IBM PC and weighs only 3 pounds less. These figures surprised me, for the keyboard's plastic



NCR Personal Computer Model 4

NCR Corporation

Dayton, OH 45479

(513) 445-2075

List Price: 128K RAM, two 360K drives, monochrome monitor, \$2,825; with color monitor, \$3,299. Hard disk model, \$4,486; with color monitor, \$4,960.

CIRCLE 796 ON READER SERVICE CARD

casing and thin profile made it seem bigger yet much lighter. The keys react well to a light touch, a boon to rapid typing, but the familiar, reassuring click is missing, and the overall feel of these keys is mushy. If you like IBM's board (and some people do), this one is going to feel very flimsy.

The CapsLock and NumLock keys incorporate LEDs bright enough to be visible from across the street. Duplicate keys abound: to the right there's a separate cursor movement pad, though the unshifted numeric pad keys also work as expected; duplicate Ctrl, PgUp, PgDn, End, Home, and Del keys form a rather strangely shaped cluster above the cursor keys; and a convenient second Return key sits next to the numeric pad.

Given time, I could grow to like this keyboard. I'd need a lot of time, though. The duplicate key cluster forces the

numeric keys, which I'm more used to for cursor control, off to the far right, so that I have to hunt for the key I need. It also incorporates every minor layout problem of the IBM PC's board, even down to the illogically small strike areas on such normally double-size keys as Ctrl and Return.

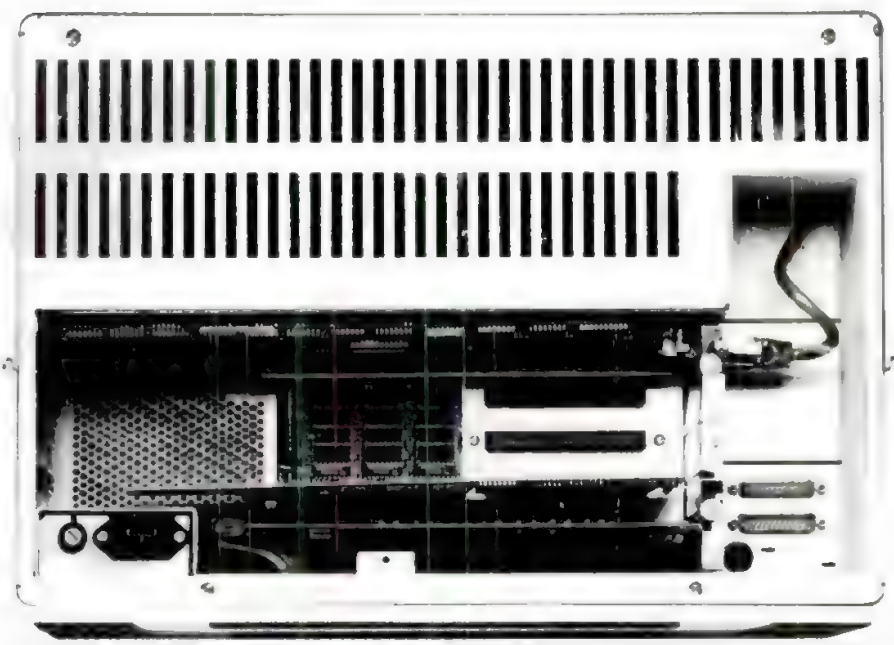
The keyboard connects to the main unit with a standard DIN plug, whose socket lies in a rectangular well in back of the machine. This 4-inch-deep well is so narrow that—for someone whose fingers are as short and stubby as mine—it is impossible to directly connect the plug into its socket. The designers solved this problem by slipping a 4-inch plastic collar over the end of its keyboard plug. One guides the plug into the socket by grasping the collar. This collar works beautifully for the keyboard cable. However, this same well is destined to cause headaches when the time

comes to connect cables for peripheral equipment.

The Model 4's built-in serial and parallel ports, as well as the business ends of plug-in expansion board ports, are also located in this well. In a unit fitted with more than the standard two ports (as in systems with user-added networking, multifunction, or internal modem boards), this well is going to get crowded. The owner's manual recommends attaching cables to a function board before installing the board into an expansion slot. My experience confirms this advice; fitting, removing, and testing cable connections in a fully loaded system will require patience and determination. However, once the connectors are in place, you can forget about them; the well design does ensure that nothing short of an earthquake will knock them loose.

The unit has a total of five expansion slots, two of which are occupied by the NCR flex disk controller and monitor adapter boards. (For the hard disk model, a third slot is occupied by a second disk controller card.) The expansion bus is located in its own compartment at the bottom half of the rear of the unit. A separate cover comes off easily for access to the expansion slots without exposing the interior of the rest of the machine, a definite plus. On the minus side, you have to remove all the boards in the compartment to get to either the motherboard's DIP switches (situated behind the display adapter board in the uppermost slot), or to install RAM beyond the basic 128K (the memory expansion area is obscured by the drive controller in the lowest slot). To their credit, NCR's writers devoted an entire chapter of the owner's manual to detailed instructions on installing options yourself.

The bus connectors, clips, and backplane rack are meant to hold full-size IBM PC-style cards, mounted horizontally and supported at both ends. This design opens the machine up to the staggering range of multifunction/special-purpose boards now available for the IBM PC. (If you



A view of the Model 4's expansion area, easily accessed by opening a separate cover at the rear lower half of the unit. Expansion boards are mounted horizontally, held in place by the mounting bracket and clips. Note that boards of less than full length are not fully supported. All connector cables exit the chassis by the side well.

like, you can even add a cash drawer to the unit, as several are available from third parties. Thus, the Model 4 can even emulate its venerable predecessors.) Though NCR markets expansion cards for the machine, such as a RAM extension card, color and monochrome graphics adapters, and additional floppy/hard disk controllers, the user is free to shop elsewhere for add-on hardware. Combo cards, incorporating several functions on one board, are a must, given the scarcity of free slots.

DOS with New Trimmings

The operating system bundled in the box is NCR-DOS 2.1, a modified version of MS-DOS 2.1. NCR-DOS 2.1 utilities

include a wonderful on-line help facility for DOS commands, a RAMdisk utility (of limited use on a machine with only 128K RAM, but nice on systems with more memory), and NCR-LINK, a linker for developing executable programs from object code modules you create.

The accompanying manual is a joy to read (as were all of the manuals NCR provided for this review). A few minutes with the manuals and it becomes obvious that NCR has set its marketing sights on initiates to computerdom. This thesis is also borne out by the on-line help facility; type HELP, and a screen comes up showing every DOS command available, with descriptions of each command's syntax

and examples of its usage. I've never seen anything like it on other MS-DOS systems.

The use of help screens is often a criterion in purchasing one software package over another; this DOS help facility will probably help clinch sales of the Model 4 over other machines in that area of the market—the first-time user—NCR expects to enter. It goes a long way toward making a new user feel comfortable with this machine.

The other aspect of NCR-DOS that caught my attention showed up when I booted the system for the first time. The master copy *forces* you to make a backup. It's there in the AUTOEXEC.BAT file;

Tests	Time in Seconds	
	NCR NCR-DOS 2.1	IBM PC-DOS 2.1
Speed in Booting Programs: <i>dBASE II</i> <i>WordStar</i>	6 6	6 6
Diskette Formatting: Without System Transfer With System Transfer	47 53	108 116
File Handling Tests: <i>dBASE II</i> Sort Test ⁽¹⁾ <i>WordStar</i> Test ⁽²⁾	77 31	82 31
BASIC Test (with GW-BASIC): Prime Number Calculation	87	66
⁽¹⁾ Time required to sort 100 records on one field and copy them to a new file. Note: Tested under PC-DOS, not NCR-DOS (see text). ⁽²⁾ Time required to go from the top of a 10-page (46K) document to the bottom.		

Figure 1: Time comparison test results: NCR Model 4 vs. IBM PC. Note: The figures for PC-DOS may differ from those in similar charts elsewhere in this issue. The comparison tests for machines under review are run on IBM PCs with slightly different equipment installed (amount of RAM, number of drives, and so on), operating under different versions of DOS. These factors can affect performance speeds in comparisons of the IBM PC or XT with the machines under review.

once you're past the date and time prompts, you're told to stick a blank disk in drive B: (or replace the one in A: on one-drive units). Hit any key and presto, a

TYPE HELP, AND A SCREEN COMES UP SHOWING EVERY DOS COMMAND, WITH DESCRIPTIONS OF ITS SYNTAX AND EXAMPLES OF ITS USAGE.

working copy of DOS (which you're instructed to begin using at once). All without even opening the manual. Some folks might consider this precaution cynical. After all, every software manual I've ever read starts out with a long-winded chapter on how to back up the master disk. Still, remember the first time you started your system? How long after that was it before you finally backed up your DOS disk? This machine forces you into developing the backup habit from the very beginning. File this under nice touches.

The basic system also includes GWBASIC on a separate disk with manual, and the owner's manual, both texts written to lead anyone painlessly toward computer literacy. The unit I reviewed also had a copy of the Model 4's technical reference manual—something has to be said for a company going to the trouble of ensuring that even its tech manuals are readable. One gets the feeling this company cares not only for new users, but for

service technicians and advanced users as well.

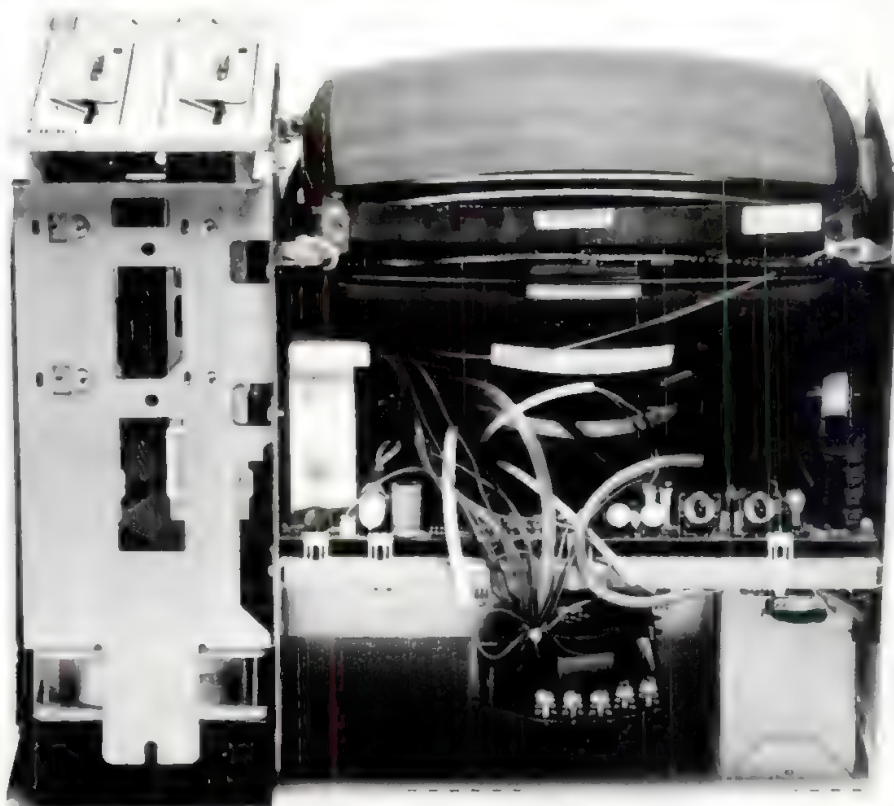
Beauty Beneath the Skin

When I pitted the two Teac half-height disk drives against the IBM PC's full-size drives, the Teacs performed very well (see Figure 1). Disk formatting gives a fair indication of how well a machine-specific version of MS-DOS is optimized for the drives used. As shown in Figure 1, formatting times were roughly half of that taken by an IBM PC under PC-DOS 2.1. Since NCR-DOS 2.1 does not have to be compatible with the IBM PCjr, NCR was able to put back all of the speed into the drive access routines that IBM had to take

out to accommodate its smaller machine. This hardware/software marriage was made in heaven.

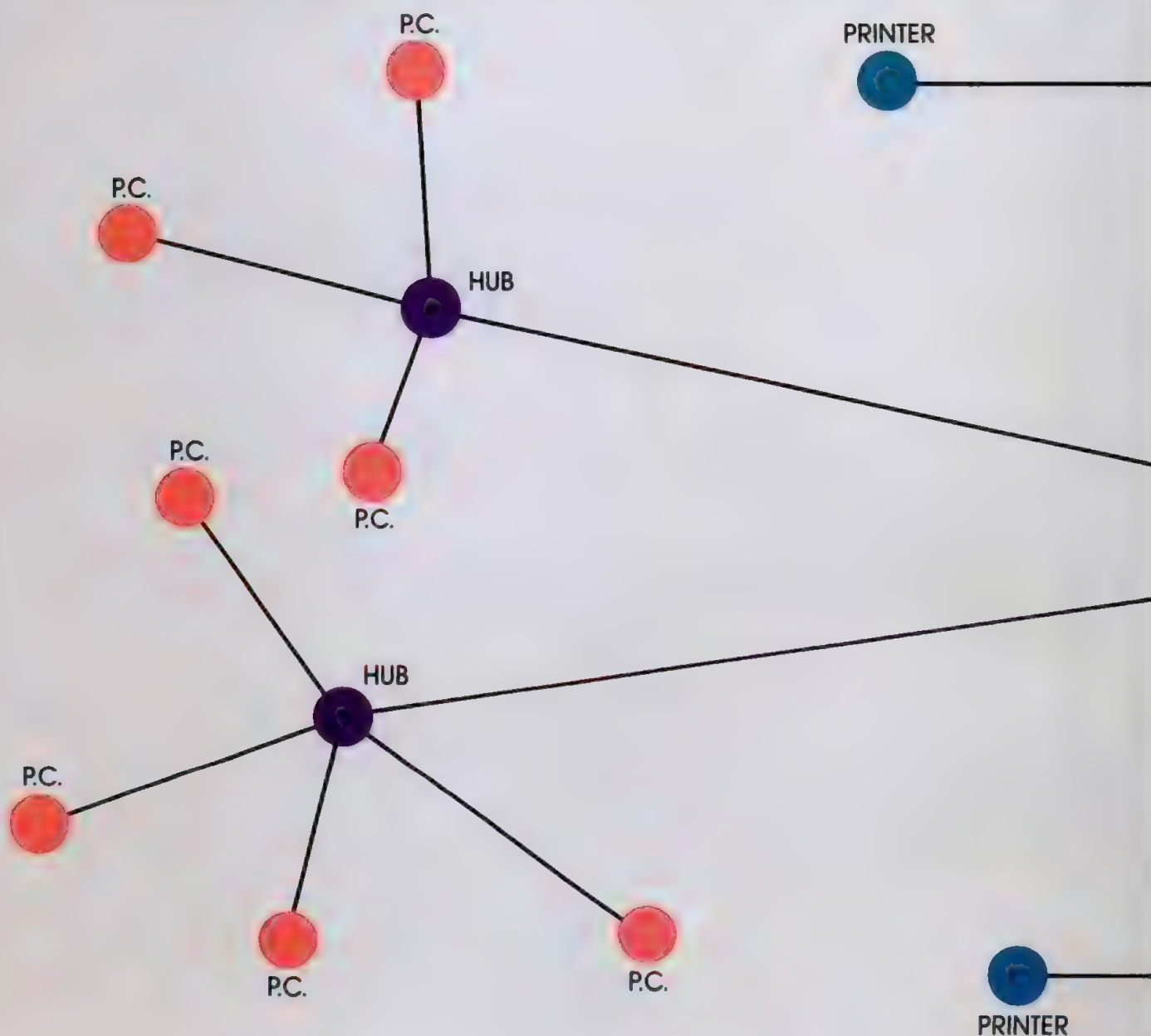
The file-handling programs I used, which primarily test a system's internal processing abilities using actual applications software, also ran slightly better on the Model 4 than on its IBM counterpart despite the outward equality of its components. This result is yet another indication of how well NCR has meshed its circuitry and operating system.

The BASIC test, *PC's* prime number calculator (listed in "A Garden of Portables," *PC*, Volume 3 Number 6), used NCR's bundled GWBASIC and was significantly slower in coming up with the



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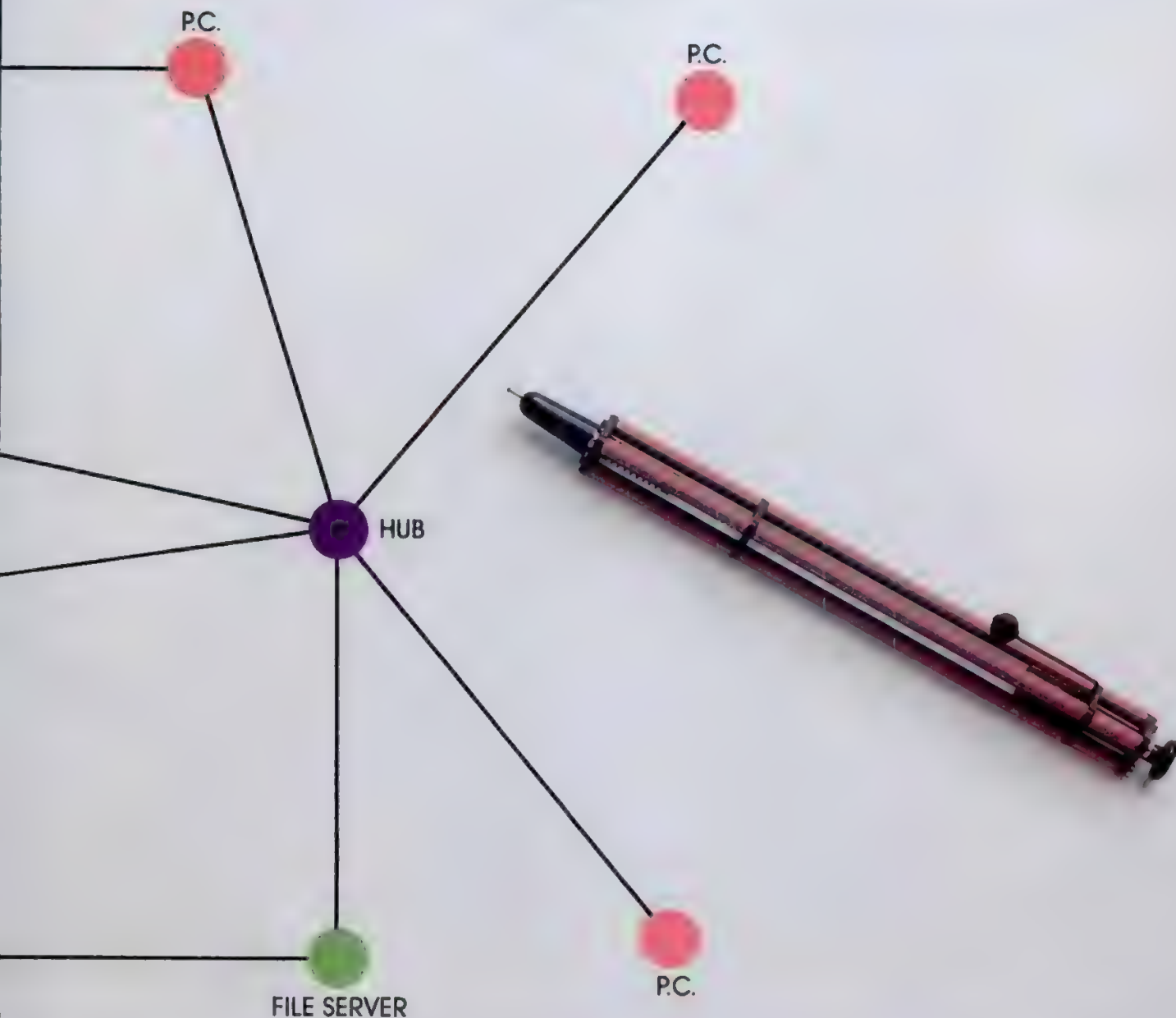
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prime numbers than the previous test results had led me to expect. This problem with GWBASIC tends to crop up often, though, when one compares compatibles from many manufacturers with the PC. IBM put a substantial portion of its BASIC in ROM, an advantage few manufacturers care to match. With an 8087 math coprocessing chip installed, this system will run the program at warp speeds.

A Gremlin in dBASE II

The MS-DOS Version 2.4 of *dBASE II* is well known for its uncanny ability to run on nearly every system billing itself as a PC-compatible. Yet, when I tried running the *dBASE II* SORT test, using a borrowed copy of the software installed for the IBM PC, I got an error message I had never seen before, "System input/output error." At first glance, it seemed that the NCR Model 4 and *dBASE II* just did not mix. Despite the successful results of the previous testing, I was ready to throw the Model 4's "PC-compatible" rating out the window.

I substituted a copy of PC-DOS 2.1 for NCR-DOS and rebooted. Lo and behold, the *dBASE II* test worked perfectly (actually running faster than it did on the PC). Yet *dBASE II* should have run on the Model 4 without resorting to an outside operating system. NCR-DOS had run everything else without problems.

NCR's Quality Assurance people apparently were aware of the *dBASE II* problem and pointed the finger at Ashton-Tate, the producers of the software. Version 2.4 of the software required a patch to run on the Model 4, a problem the computer supposedly shares with those made by several other manufacturers. Using DEBUG, I found the addresses where the corrections were needed and made the change. The NCR ran the modified *dBASE II* under its own operating system 2 seconds faster than it did under PC-DOS 2.1. (The new *dBASE II* now reads "Version 2.4A" on the screen.)

A call to Ashton-Tate to discuss this patch got a different story from what I'd

heard from NCR. It claimed this patch was necessary only because NCR-DOS uses disk read/write routines substantially different from those used by PC-DOS (a tale borne out by the fact that *dBASE II* did run on the NCR under PC-DOS). How then, I asked, was the NCR able to run so many other PC programs without problems, even the tricky ones like Microsoft's

**IF YOU
WANT DBASE II
FOR THIS SYSTEM,
MAKE SURE IT'S
THE UPGRADED
2.41 VERSION.
OTHERWISE, GET
READY FOR SOME
TRICKY PATCHWORK.**

Flight Simulator? No answer.

The whole question became moot, though, as about halfway through my tests for this review an upgraded version of *dBASE II* (Version 2.41 from Ashton-Tate) showed up in PC's offices. Curious, I ran the same SORT test program under the new version without installing it for any system or jury-rigging it with patches. It ran without a hitch, sorting and copying the test file over 7 seconds faster than before. (The results shown in Figure 1, however, are for the older version of the software.)

The moral of this story? If you want *dBASE II* for this system, make sure it's the new 2.41 version. Otherwise, get ready for some tricky patchwork.

On its negative side, plugging things

into the Model 4 isn't something you'd do in a hurry. The keyboard, although lightweight enough to sit on your lap, is way too big to do so. Also, it will take a PC user a while to get used to the placement of some of the keys. Finally, its cost is somewhat higher than the IBM PC it hopes to compete against, though the prices grow more competitive when you compare the features of the color display/hard disk version against a color PC-XT.

But I've got to admit this system's got a lot going for it. It's easy to like. Aside from my quirky experience with *dBASE II*, the Model 4 ran every other PC program I fed it without problems. Even Microsoft's *Flight Simulator*, a self-booting program with complex graphics routines requiring direct calls to IBM's ROM BIOS flew without a hitch. NCR's emulation of IBM's BIOS seems to work almost as fast as the real thing. It certainly rates being called PC-compatible.

NCR-DOS 2.1's added utilities are the kind of stuff you'd normally pay extra for, and the GWBASIC bundled with the system is advanced enough to do almost anything you'd like it to do. The documentation is first-rate, and the hardware allows you to take advantage of the ever-expanding options available to the IBM PC user. Not least in the list of advantages, the company supporting the system is big enough to be around for a while. It'll probably be around to see the day when our current wonderful personal computers join its brass cash registers as quaint antiques. Lastly, this aesthetically designed full-size system, in a market full of three-piece lookalikes and shrunken portables, looks good on an office desk, especially with the color monitor.

I've got a feeling that the Model 4 will quickly develop a loyal following. For brand-name recognition, NCR is right up there with IBM. What's more, NCR has that 100-year record of satisfied customers at the grass-roots level of American business. Few companies can say that.

I just sort of wish they had thrown in a touch of brass. ■

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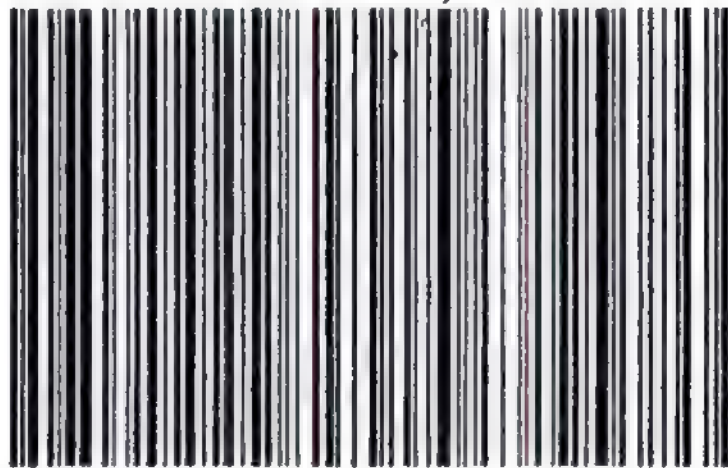
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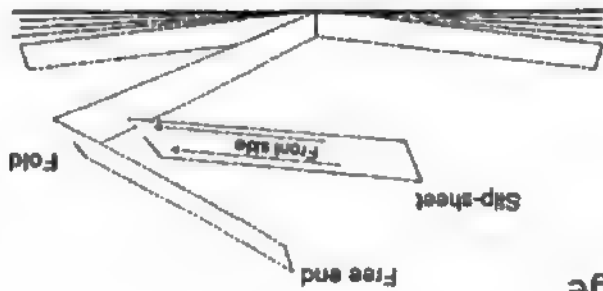
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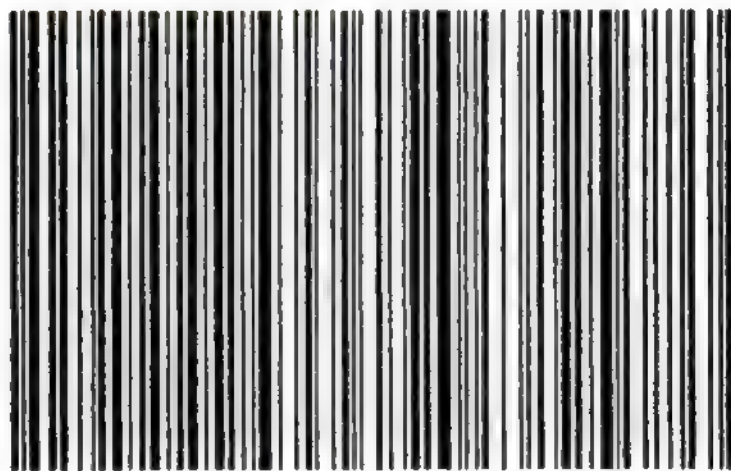
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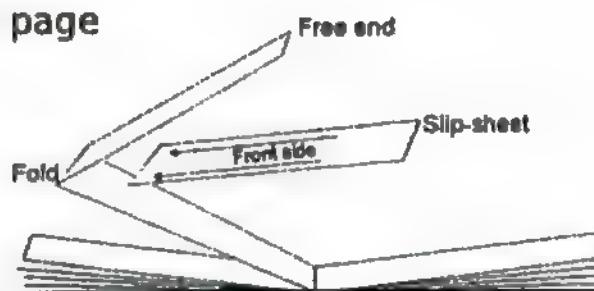
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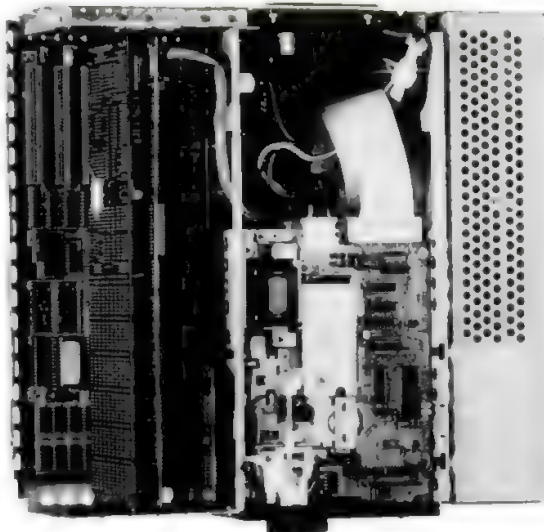
One more IBM PC-compatible microcomputer may not seem like a big deal, but when the new entrant comes from a giant international communications company, it could have the clout to start major changes in the marketplace. Ericsson, Inc., may not be a household name in the United States, but the Swedish company is the fourth largest telecommunications-equipment manufacturer in the world. Its 1983 annual report claims the company "is one of the few organizations able to deliver a complete telecommunications package—switching and transmission systems, cable, instruments, and peripheral equipment—for public, private, and military networks virtually anywhere in the world." And Ericsson's line of workstation tools—including word processing stations, telephone systems, and 3270-compatible data terminals—has now been expanded to include a capable microcomputer.

The Ericsson PC is a highly PC-compatible desktop machine. The basic model costs \$3,065 and features 256 RAM, two half-height, 360K disk drives, a monochrome monitor with graphics capability, a graphics adapter, a serial port, a parallel port, and six expansion slots. A hard disk model that exchanges one of the floppies for a 10-megabyte hard disk lists for \$5,000. Replacing the monochrome monitor with a color model adds \$474 to the price of either system. Ericsson also offers a competitively priced multifunction

board, which adds 64K to 256K RAM, an extra serial port, and a battery-operated clock.

Like its IBM counterpart, the Ericsson PC is separated into three pieces: the sys-

tem unit houses the floppy disk drives, the monitor is designed to sit on the system unit, and a separate keyboard attaches to the system unit via an extendable cord.



The interior of the Ericsson PC exhibits solid, typically Swedish workmanship and good design, including a well-shielded power supply and sensibly handled power distribution and peripheral cabling.

tem unit houses the floppy disk drives, the monitor is designed to sit on the system unit, and a separate keyboard attaches to the system unit via an extendable cord.

The Outside

The Ericsson PC comes in two relatively small boxes—one contains the system unit and the keyboard, and the other holds the monitor. Ericsson also throws in a small flat-blade screwdriver, the only tool you'll need to put it together.

Documentation consists of an installation guide, a guide to BASIC, and a guide to MS-DOS. These last two items contain little more than lists of available commands but more complete manuals for BASIC and MS-DOS are available.

Installation is easy enough. I unpacked both boxes and connected the system in just 5 minutes.

The machine's appearance is quite unusual and, in my opinion, not altogether pleasing. The cases are tan, the two disk

desktop than an IBM PC does.

The system unit is dominated by the two disk drives, which are mounted one on top of the other in the middle of the front panel. Happily, the bottom drive is easily accessible even when the keyboard is placed in front of the system unit. The power-on switch and indicator are also on the front, which is a much more convenient arrangement than the IBM PC's switch on the back of the unit. The back does contain six removable panels for access to the add-on boards, and, on the right, two DB-25 connectors, one each for the standard parallel and serial ports.

The keyboard's cord is long enough so you can comfortably type with the keyboard in your lap. The cream-colored key caps sport brown legends. They're laid out in a pattern echoing the IBM PC's, but Ericsson has corrected some of the mistakes in the original IBM PC keyboard. The CapsLock and NumLock keys are both equipped with indicator lights, and



Ericsson PC

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the numeric keypad has been improved to make it easier to use for someone accustomed to an adding machine. Specifically, the numeric keypad has been separated from the rest of the keys, the plus (+) key

THE INSTALLATION IS EASY. I CONNECTED THE SYSTEM IN JUST 5 MINUTES.

has been reduced to standard size, and an additional Enter key has been added. In addition, all of the keys are full-faced—that is, their striking surface is as large as their base.

The key action felt stiff at first, but I soon adjusted to it. The keys offer no audio feedback, which will be appreciated by anyone who has ever shared a work space with several microcomputers.

Ericsson describes the monochrome monitor as amber, but it looked orange to me. The unit measures 12 inches across the diagonal in the front, tapering toward the rear. Designed to sit on top of the system unit, it rests on two small felt-covered ledges in front and a spring-loaded adjustable slide in the rear. By moving the slide, you can adjust the viewing angle of the screen. The monochrome monitor needs only a single cable to supply both the signal and the power. The optional color monitor requires separate signal and power hookups.

The Inside

Two screws hold the system unit's cover on, and it slides off easily without catching on any cables or wires. Inside the

machine, I didn't see anything especially fancy, just typically Swedish solid design and good workmanship. Ericsson has shielded the ample power supply well and nicely handled the setup for power distribution and peripheral cabling. Six bus connectors correspond to the six panels on the backplane, and, surprisingly, a seventh bus connector on the motherboard, which is not accessible through the backplane, holds a 128K RAM board. (Along with the 128K on the motherboard itself, this arrangement brings the unit up to a comfortable 256K.)

Ericsson put more circuitry on the motherboard than IBM did. In addition to 128K RAM, the motherboard contains the disk controller, a parallel port, and a serial port. The particular system I tested also had a multifunction board supplied by Ericsson, which brought the total configuration up to 640K RAM, two serial ports, one parallel port, and a clock. Since the display adapter occupied one of the six available slots, and the multifunction board another, the system had just four slots left.

How It Runs

That's what it looks like and how it's configured, but the real questions center on "How well does it run?" and "How PC-compatible is it?" The answers are, "very nicely" and "very compatible."

The Ericsson PC, like the IBM PC, goes through diagnostics after you turn the power on. When it completes the diagnostics, it tells you how much RAM is available. If no DOS disk is in the A: drive, it displays a "Waiting . . ." message and waits for you to insert one. At this point, it starts to stray from IBM's start-up procedures.

The DOS system supplied with the Ericsson PC looks for a special program, PRESTART.COM. This program determines which national keyboard layout and which graphic characters to use (remember, Ericsson is an international company). Only then does the system look for and execute the AUTOEXEC.BAT file.

The display quality of the monochrome monitor is equal to that of the IBM PC, but without the shadowing caused by IBM's long-persistence phosphor. *(continued)*

	IBM PC	Ericsson PC
128-byte write test	98	102
128-byte read test	54	56
512-byte write test	392	403
512-byte read test	222	223
1-2-3—sort 500 records on one key.	110	110
WordStar—find the end of a 50K file.	30	31
BASICA/GWBASIC—find all prime numbers from 0 to 50.	61	78
dBASE II—sort 100 records.	83	81

Figure 1: These informal benchmark comparisons of the IBM and Ericsson PCs indicate that their performances are quite similar. The read/write tests involved 100 records read or written 10 times for a total of 1,000 record operations per test. All times are listed in seconds.

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Cross reference table generated—

Plain English Error Messages—

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Z-80 XASM		500.00	99.50	99.50	99.50
Z-8 XASM	99.50	500.00	99.50	99.50	99.50
6301(CMOS) <i>new</i>	99.50	500.00	99.50	99.50	99.50
6500/11 XASM <i>new</i>	99.50	500.00	99.50	99.50	99.50
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6800,2,8 XASM	99.50	500.00	99.50	99.50	99.50
6801,03 XASM	99.50	500.00	99.50	99.50	99.50
6804 XASM <i>new</i>	99.50	500.00	99.50	99.50	99.50
6805 XASM	99.50	500.00	99.50	99.50	99.50
6809 XASM	99.50	500.00	99.50	99.50	99.50
8748 XASM	99.50	500.00	99.50	99.50	99.50
8051 XASM	99.50	500.00	99.50	99.50	99.50
8080 XASM	99.50	500.00	99.50	99.50	99.50
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To measure performance, I ran a series of informal benchmark tests on both the IBM PC and the Ericsson PC (see Figure 1). Given that both machines use the same 4.77-MHz 8088 processor, the results were just what you would expect: the machines perform very similarly. The only exception was that the Ericsson PC

10 percent of its sales. But you're sure to hear more from this huge multinational complex as its plans for developing the American market mature.

As for the Ericsson PC itself, the question becomes, "Who will buy it?" Ericsson plans to market it through a network of authorized dealers, while a direct-sales force will handle the very large accounts. Worldwide availability will win it some corporate customers. Other companies may simply extend their purchases of Ericsson telecommunications equipment to include the PCs. And, although Eric-

son has not really targeted home computer users, the company's size and stability may generate some interest from home users.

Ultimately, though, Ericsson has given individuals and companies looking for a single machine very little reason to choose the Ericsson PC. It offers no performance advantage and very little price advantage over the IBM PC. This machine seems to be merely a stepping-stone on Ericsson's path to more advanced workstation devices that will integrate both computing and telecommunications. ■

YOU'RE SURE TO HEAR MORE AS ERICSSON'S PLANS FOR DEVELOPING THE U.S. MARKET MATURE.

ran the BASICA/GWBASIC test almost 30 percent slower than the IBM PC. The Ericsson comes with GWBASIC, but all the BASICA programs I tried executed flawlessly, except for one small bug in a music program.

I also tried my standard collection of IBM PC application programs, including *1-2-3*, *Flight Simulator*, *WordStar*, and *dBASE II*, among others. All executed beautifully, indicating that the Ericsson probably deserves the highest compatibility rating. Since the machine uses the same clock rate as the IBM PC does, it should run even those programs that depend on that particular timing, such as many communications and game programs. I would be careful of timing-critical BASIC programs, though.

Is the Ericsson PC just another IBM PC clone? In many ways it may seem like one, but the size and stature of the company behind it adds importance to its arrival on the market. Ericsson's marketing efforts in the U.S. began only in 1980, and North America currently accounts for just

CLOCKING LOTUS

The ability to run 1-2-3 used to make or break PC-compatible software. Today, 1-2-3 tests only speed.

If you are interested in purchasing an IBM PC-compatible micro, you obviously want a machine that can utilize both software and plug-in hardware designed for the IBM PC. In the strictest sense only IBM can (legally) make a fully IBM-compatible PC because of its proprietary BIOS. So, there will always be *some* programs or boards no "compatibles" can run. A year ago the Compaq was almost unique in its ability to run *most* IBM software "off the shelf."

Since then, however, the MS-DOS Version 2.x has upstaged Version 1.25. This change, coupled with greater sophistication of PC-clone design, reduces the need for "special versions" of the most popular PC programs. Moreover, with recently designed compatibles, the ability to run Lotus's *1-2-3* and Microsoft's *Flight Simulator II*—once the rock on which compatibles usually crashed—has become commonplace. We still use these programs (and the

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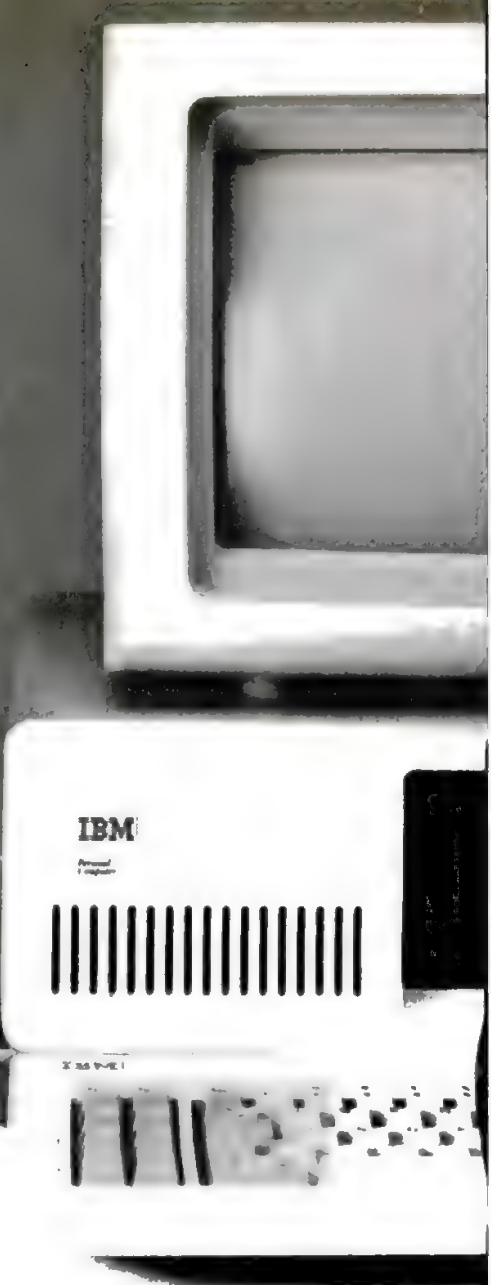
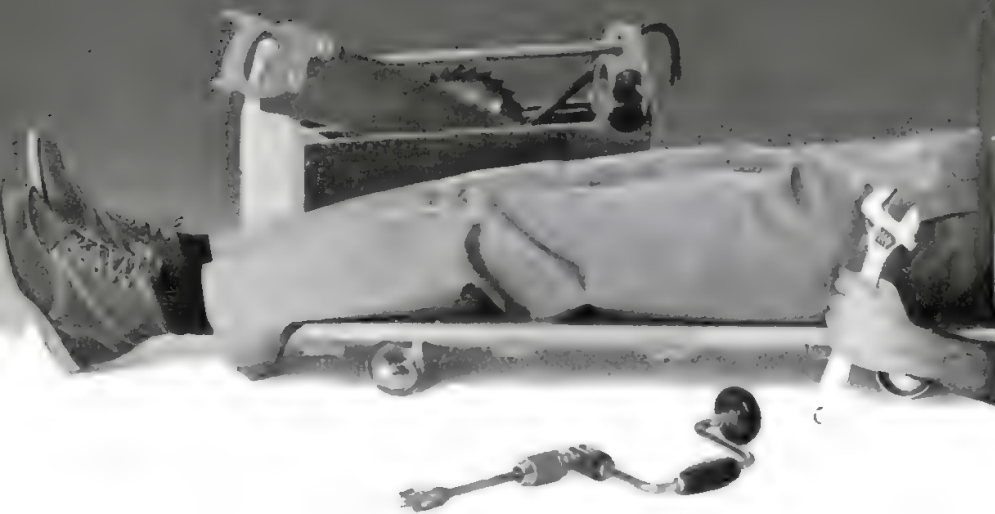
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Mention "Stearns Desktop Computer" at any gathering of computer industry professionals, and chances are you'll get nothing but blank stares. Though Stearns Computer Systems, a small (70-employee), Minneapolis-based manufacturer, has been producing these extraordinarily fast PC-DOS-compatible machines since June 1983, the marketing approach has been distinctly low-key.

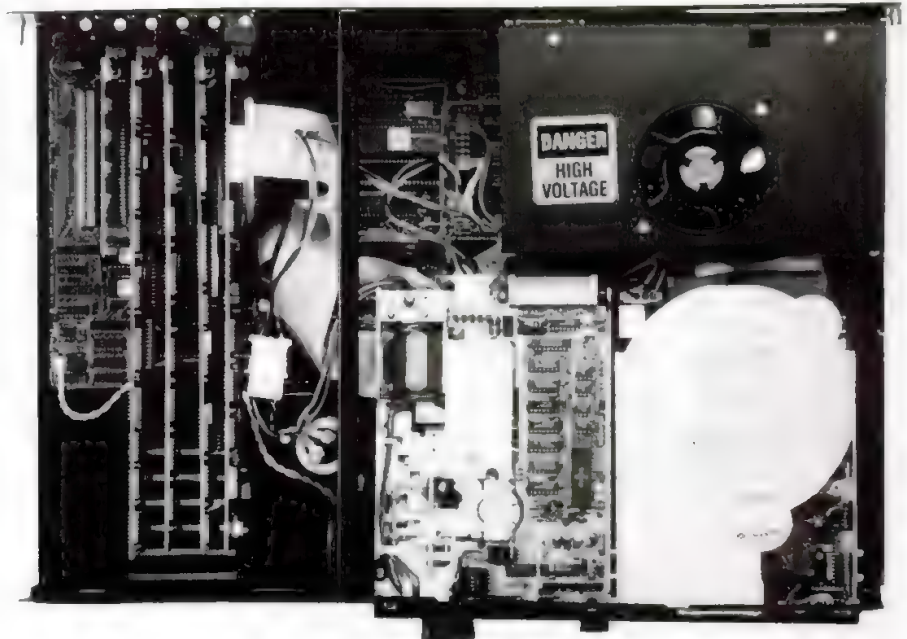
The company has concentrated its marketing efforts on creating its own network of full-service dealers in the United States and in establishing foreign distributors in 31 countries. These dealers provide purchasers with complete individualized packages, including training, support, and service, much in the manner of minicomputer companies. This approach has worked well for many specialized computer makers, offering the prospective buyer complete customized workstations for either individual or network applications. Yet—as those blank stares testify—it hasn't worked to make "Stearns" a household name.

More's the pity, for the Stearns Desktop Computer, which is built around an 8086 microprocessor operating at an 8-MHz clock rate, outperforms similarly equipped IBM PCs or PC-XTs. It offers features as standard equipment that either aren't available at all for the IBM PC or are obtainable only from third parties at extra cost. Even the basic model Desktop Computer, with 128K RAM and two

DSDD drives, which lists for \$2,995, incorporates ROM-based asynchronous communications hardware, a remarkable programmable keyboard, a battery-backed clock/calendar built into the motherboard, and impressive true 16-bit performance.

Except for the disk drives, keyboard, and color monitor, Stearns Computer Sys-

To augment the computer's communications features, the company offers MICRONETWORK, a local area network for linking up to five Stearns (and *only* Stearns) Desktop Computers. Memory expansion boards allow the system up to 896K RAM. Still other Stearns boards offer parallel ports and color and mono-



Though the Stearns Desktop is finely engineered, none of its six expansion slots will accept a board designed for the IBM PC.



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List Price: \$2,995 with 128K RAM and two disk drives; \$4,995 with 10-MB hard disk (both versions include a 12-inch monochrome monitor).

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tems manufactures all parts (including the monochrome CRTs). The extensive line of optional components can be mixed and matched by the user or the vertical market integrator to produce near-perfect workstations. These options include four different 12-inch monochrome displays (black and white, amber, green, and something called "eggshell"); a vertically oriented 15-inch monochrome monitor capable of displaying 54 lines of 80-column text; and a 13-inch color graphics monitor. Also available are internal and external 10- and 20-megabyte hard disks and a standalone cartridge backup unit.

chrome display adapters.

When the computer is first powered up, a built-in diagnostic routine runs through each component in the system, displaying its checkout progress on screen. The user can then boot the desired operating system from any drive (including a hard disk) by selecting a function key from among those displayed on the initial screen. For the operating system, the buyer can specify either a generic version of Microsoft's MS-DOS (Version 1.25), ST-DOS (Stearns's emulation of PC-DOS 1.1), or a modified Version 2.0 of Digital Research's Concurrent CP/M. Concurrent

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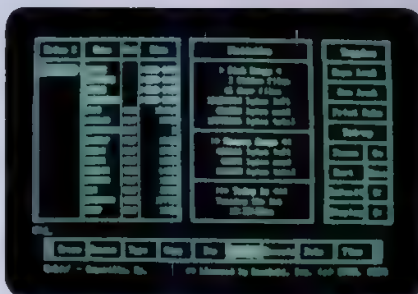
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CP/M is the only operating system presently available from the company that makes use of four additional LED-equipped toggle keys, S1-S4, which are used to switch the screen display between different applications. Alternatively, the system can run PC-DOS 2.0 or 2.1 purchased off the shelf from non-Stearns sources.

For PC-DOS 2.0 or 2.1, Stearns recommends adding several Stearns utilities to the boot disk and modifying the AUTOEXEC.BAT file accordingly. These include CLOCK.SYS, a utility to read the time and date from the system's clock/calendar; STEARNS.COM, a command file required to use the company's excellent *Asynchronous Communications Program (ACP)* and other Stearns-developed software; and PRINT.COM, for linking a parallel printer to the system. Dealers are trained in making these modifications as part of the services they provide. The company's policies go a long way to insure customer satisfaction with its products.

Testing the Diagnostics

To test the ROM-based diagnostic routine, I tried powering up the system with various components disconnected. In each case, the routine correctly identified the source of trouble (for example, Keyboard Error 01). Computer board problems are identified by a number, which is only useful in explaining the problem to Stearns representatives (the technical manual doesn't list these numbers). For the more technically inclined, Stearns also sells a separate, more elaborate diagnostic program for locating the exact nature of a problem identified by the self-test routine.

With all of these options and peripherals available from one manufacturer, few businesses will need to go elsewhere for components to create a workstation. That's just as well, since the machine will not accept third-party substitutes. The limitation is a deliberate part of the company's marketing strategy.

A Look at the Hardware

The machine I reviewed included the 10-megabyte internal hard disk and 384K RAM. This same machine was reviewed briefly earlier this year (see "Playing Hardball Against the XT," *PC* Volume 3, Number 6). The standard Shugart half-height floppy and the Miniscribe 10-

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megabyte fixed disk both performed slightly better than the XT's drives in *PC*'s read/write tests (see Figure 1); the Desktop's advantage is due mostly to the disk controller board's 16-bit bus interface. The motherboard includes a socket for an 8087 math coprocessor, a built-in clock/calendar with a user-replaceable battery, an async communications port that can link the machine directly to other Stearns Desktop PCs, and an easily accessible potentiometer useful in adjusting the volume of the system's internal speaker.

The motherboard also includes six expansion slots, two of which are occupied by the disk drive controller and a combination monochrome display/serial port board. (Slots 3 and 4 in the system I reviewed were also occupied by an optional memory card and a color/graphics

adapter.) None of the slots will accept a board designed for the IBM PC. Five of them use a completely different connector; the sixth slot, though, uses a connector that is physically identical to those favored by IBM. *PC*'s earlier review assumed this slot would accept a PC card. For this review, however, I again looked for the board that would work in that slot. Alas, to make this mystery slot take any IBM PC card, even a half-size one, you would have to hacksaw away part of the metal rack that holds the cards in place, a job that requires removing two drives, the power supply, and the machine's motherboard. Even if you were to do all that, there's still no guarantee a PC card would work. The folks at Stearns won't say why that slot is different from the others; it won't even accept Stearns boards. Stearns is manufacturing a parallel port adapter for the mystery slot, though the company makes a parallel port to fit the regular slots, too.

Hardware compatibility with the IBM PC is not in itself a criterion for judging any computer, especially one that incorporates such fine engineering. Still, to include a connector that isolates one slot without apparent reason doesn't make much sense.

Keyboard Magic

The Desktop's 94-key keyboard incorporates several features that make it both a joy and a headache to use. Joys first: A special PROG key, sporting its own LED, allows the user to assign temporarily strings of up to 1,024 characters to any of the 26 alphabet keys. To assign macros, you first press the CTRL, PROG, and target alpha keys simultaneously. This activates the target key's buffer (there's one for each key), and the PROG key's LED lights up. To complete the assignment after entering the desired string, you again hit the CTRL and PROG keys. The stored macros are kept in memory until the system is rebooted, shut off, or the target key is reprogrammed.

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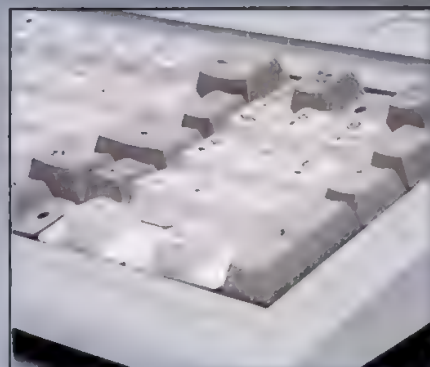
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tions, or any similar combination of keystrokes. This saves a lot of repetitive typing, and the process takes only a few seconds. Because this feature is hardware-based, the two-key macros can be programmed at any time during the course of an application without interrupting the work on-screen to jump to a separate macro utility program.

A mixed joy: The Stearns Desktop Computer can access four function key banks, allowing up to 40 function keys for each application program, as well as 40 keys for each operating system supported by Stearns. The programmed soft key tables are called up by an appropriate batch file prior to running the application, through the use of either Stearns's LTYPE or PC-DOS's TYPE commands.

The programmed functions are displayed on the last line of the screen, grouped on-screen in the same manner as the keys at the top of the board. A special FUNCT key near the right-hand Shift key allows you to switch between the four banks of keys to find the one you need. This arrangement is remarkably convenient; single keys can be permanently set to replace frequently used multiple keystroke commands and to call up batch files or programs. Many computers could benefit from such a versatile arrangement.

The application programs sold by Stearns have been customized to take advantage of the Desktop Computer's soft function keys. Level II programs (those which Stearns has tested as compatible, but which the company does not sell or directly support) require you either to create soft function keys yourself, pay someone else to do it for you, or do without the keys altogether. (Stearns markets a utility program that simplifies programming these function keys, as well as the TAB, TAB SET, and the unshifted numeric pad keys. Thus, you can set up a completely personalized keyboard to speed any application compatible with the machine. Anyone who purchases the system should buy this utility also.)

Now the headache: Application pro-

grams that make use of specific IBM PC keys, such as the End or the numeric keypad's Enter keys, to perform assigned functions won't work very well on the Stearns keyboard unless you first assign the called-for functions to the keys. I first noticed this problem while working with a word processing program that used the numeric keypad's unshifted plus sign key to create special punctuation characters on screen. Pressing + on the Stearns keypad simply called up the function assigned to it from the previous application (a situation that can cause havoc if you've pro-

FOR APPLICATIONS THAT ARE CALLED UP FROM DOS OR GENERIC BASIC, COMPATIBILITY IS VERY GOOD.

grammed Quit-Without-Saving or some such command for that key). The software's documentation did not say what signal it expected to receive from that key, so it was impossible to program it. Hence, a perfectly good word processor ended up on the shelf, a waste of money.

The above soft key hangover problem also plagues the function keys themselves for applications not available from Stearns. Unless new keys are created specifically for the application—and are called up by a batch file *before* the program is run—whatever functions are left over from the last program remain in effect. (Though there are ways to get around this, the problem is ignored by the

user's manual. Stearns wants to sell software, too.)

A personal comment: Given a choice between switching to an IBM PC keyboard or keeping the Stearns, I'll keep the Stearns, thank you. Its touch is excellent, the toggle keys sport LEDs, and the key arrangement makes sense, especially where it differs from IBM's. Even the soft key hangover program can be overcome with a little experience.

Stearns's keyboard adaptations of the software it offers significantly reduce the amount of time required to learn and use the programs. However, for programs not offered by Stearns, you must devote time to determining which functions to assign to which keys. Again, the full-service dealers are a great help in getting new applications running smoothly.

Software's Compatible—Almost

As part of its marketing strategy, Stearns Computer Systems has adapted over 40 popular PC programs for its Desktop Computer, including Lotus's 1-2-3, the BOSS and Open Systems accounting packages, WordStar and WordPerfect, dBASE II, and some profession-specific applications software. Stearns-modified software, which is supported by an excellent telephone assistance staff, is listed in a Level I catalog. Software that Stearns has tested as working on its machine, but which the company doesn't sell or support, falls into Level II. Between the two categories, the 40 software packages cover general business applications and such professions as law, medicine, dentistry, and statistical analysis.

The Desktop Computer will also run most generic MS-DOS software, though, like other PC-compatibles, it refuses to run programs that make direct use of IBM's ROM-BIOS. Generally, this means self-booting PC software; for applications that are called up from DOS or generic BASIC (not IBM's BASIC), compatibility is very good. Popular programs such as WordStar and dBASE II run beautifully on the Desktop PC—indeed, they

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CIRCLE 385 ON READER SERVICE CARD



actually perform considerably better than on the IBM PC, owing to the Desktop PC's 8086 chip and the 8-MHz clock rate (about twice the clock rate of the IBM PC-XT). The speed in loading these applications is such that you can tack on batch files to get working function keys and still not appreciably slow the programs down.

Notably absent from the Stearns software catalogs are graphics programs. Stearns's color and monochrome graphics hardware are recent additions to the product line. Software offerings have yet to

catch up. Thus, though the Stearns-adapted version of Lotus's 1-2-3 will work with the new hardware for business graphics, the Desktop PC is still not a machine for computer artists.

A related note: I have yet, despite rather diligent searching, to find a single game program that'll run without problems on this machine. Microsoft's *Flight Simulator* (which is used in PC-compatibility tests *because* of its ROM calls) freezes at the opening screen. The Stearns Desktop Computer is strictly business. Forget about blasting ECON ships from *Zuran*

space or outfoxing *Stix* guardians on this machine!

Programming

Four high-level programming languages are available directly from Stearns: MS-COBOL, MS-Pascal, MS-FORTRAN, and MBASIC (Compiled or Interpreted). Only the MBASIC Interpreter was available for review. Unfortunately, this form of BASIC is one of the lowest common denominators of the language. It failed to run PC's standard BASIC prime-number calculation test. The Stearns peo-

Stearns 10-MB Desktop Computer vs. IBM PC-XT

Time in Seconds

Drive Access Tests	Stearns		PC-XT	
	Floppy	Hard Disk	Floppy	Hard Disk
Speed in Booting Programs:				
<i>dBASE II</i>	6	1.0	6	2
<i>WordStar</i>	5	1.5	6	5
Diskette Formatting:				
Without System Transfer		65		69
With System Transfer		76		75

Figure 1: Time comparisons for drive access tests.

Stearns 10-MB Desktop Computer vs. IBM PC-XT

Time in Seconds

Program Performance Tests	Stearns		PC-XT	
	Floppy	Hard Disk	Floppy	Hard Disk
File Handling Tests:				
<i>dBASE II</i> Sort Test ¹	75	19	77	25
<i>WordStar</i> Test ²	33	6	33	12
BASIC Test (with GWBASIC):				
Prime Number Calculation		34		66

¹Time required to sort 100 records on one field and copy them to a new file.

²Time required to go from the top of a 10-page (46K) document to the bottom.

Figure 2: Time comparisons for program performance tests.

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- Memory sockets for up to 384K
- Parallel Printer Port (LPT1 or LPT2)
- AST SuperPak Software

Options:

64K memory	\$35
Game Option	\$35

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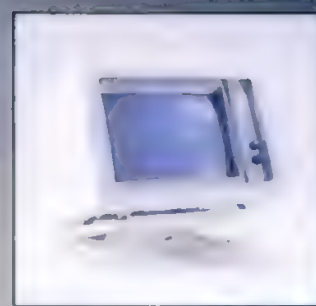
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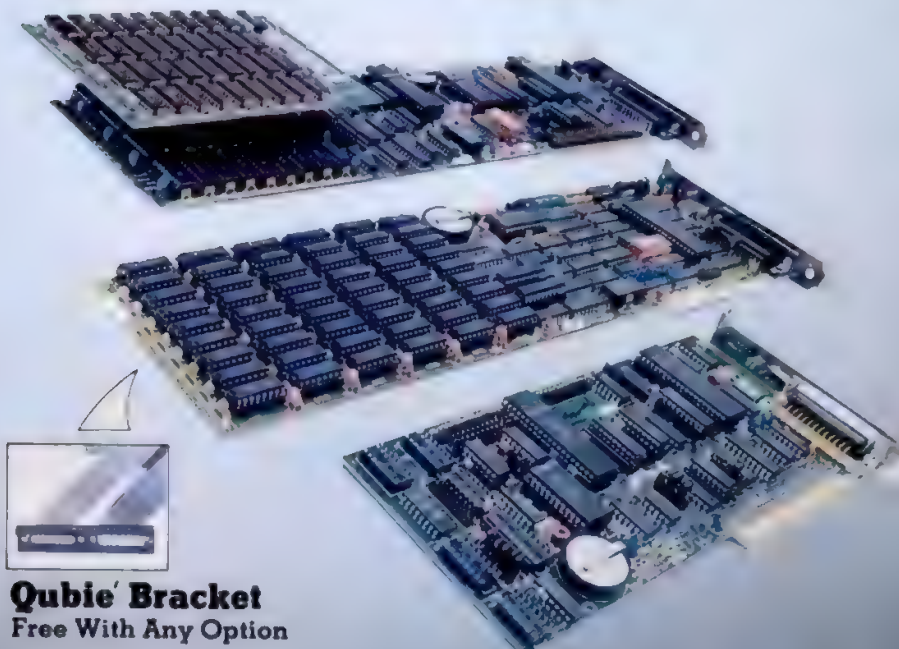
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ple informed me that a second version of the *lingua franca*, in its GWBASIC incarnation, will be forthcoming (though not in the very near future). Until then, users who want a version of BASIC with more features should look at outside software dealers' shelves.

Certain characteristics of the Desktop Computer as a BASIC programming tool became evident as I ran these tests. First, the machine lists programs on the screen so fast that all you can see is a blur of line numbers. To compensate, the keyboard has a STOP SCN key that acts like IBM's Ctrl-NumLock combination to halt screen scrolling. Pressing any key starts the scroll again. With a little practice, a programmer can use this key to start and stop the screen from scrolling at exact points in a program—a very real convenience with long program listings.

Second, hitting the HOME key of the numeric keypad to clear the screen and begin at the top also works so blindingly fast that its response is impossible to measure. To someone accustomed to BASIC programming on the IBM PC, the cleared screen comes as something of a surprise. In the proverbial blink of an eye, a screen full of characters disappears.

Third, the soft key hangover problem reared its ugly head again. It happened like this: I loaded a borrowed GWBASIC disk into the machine. The screen cleared and the familiar BASIC screen format came up, complete with its own function key legend on line 25. However, the DOS soft function keys (which the Stearns displays on line 26) were still there, so there were two rows of legends. Pressing what should have been, under BASIC, the LIST key (F1), I instead got the DOS function assigned to that key.

To solve the problem, I used Stearns's function key utility to add a phantom row of function keys to the DOS set. This strategy worked perfectly—the machine promptly accepted BASIC's definitions for the keys. Indeed, this solution promises to work for the troublesome applications programs referred to earlier—a row

of phantom keys for every program, perhaps?

Performance Analysis

As shown in Figure 2, the Desktop Computer's most significant advantages over an IBM PC-XT's performance showed up in the tests involving actual applications programs. The test routines

THE APPLICATION PROGRAMS SOLD BY STEARNS HAVE BEEN CUSTOMIZED TO TAKE ADVANTAGE OF THE DESKTOP COMPUTER'S SOFT FUNCTION KEYS.

were created to limit or eliminate disk drive access factors in an attempt to recreate the program's performance as if the user were sitting in front of the machine impatiently waiting for a task to finish. *dBASE II*'s SORT function was used instead of the much faster INDEX function, because SORT is notoriously slow. Even so, the Stearns Desktop PC took a great deal of frustration out of sorting a data file (though the results are not as impressive as one would have liked because the SORT function also copies the new file to disk).

Using a borrowed version of GWBASIC, I managed to run PC's prime-number calculation test (listed in "A Garden of Portables," *PC*, Volume 3 Number 6). As Figure 2 shows, the Desktop PC found all the prime numbers between 1 and 50 in

slightly more than half the time taken by the PC-XT.

Our last test involved the SYSINFO program included in *Norton's Utilities*, a loose guide to compatibility that rates a system against the IBM PC on a decimal scale, where 1.0 equals the processing capability of the PC. The Stearns produced a 1.9 rating (roughly 90 percent better). Although different tests will give different results, the fact remains that the Stearns Desktop PC is demonstrably faster at processing data than the majority of the PC-compatibles on today's market.

What is difficult to quantify is the overall sense of speed of the Stearns Desktop PC as it zipped through such common word processing chores as block moves and copies and global search-and-replace while I prepared this review. Although *WordStar* allows the user of any machine to work with one document while printing another, the loss of performance speed on most machines, including the IBM PC-XT, is so great that few users bother. With the Stearns, such concurrent processing of two files is so painless that it will become commonplace.

This computer is well designed for the niche its creators envisioned for it. They see it put to best use as a workstation in a multiuser, multitasking business environment. It also is well suited as a firm's only computer. Several of its features, including the keyboard, will forever be a part of an intense love/hate relationship, yet the machine itself is easy to like.

The company behind the Desktop Computer enthusiastically supports its customers—Stearns representatives were patient when we asked them to work out a problem for us, and they showed unshakable faith in the company's products. The technology that is incorporated into the machine's design reflects good engineering and value for its class. In a market where some computers are obsolete before they leave the engineer's drawing table, the Stearns Desktop Computer should be around for a while. Even if the name does get blank stares. ■

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It's attractive gold anodized case houses seven status lights (who says low prices means a shortage of features). It fits comfortably under a standard telephone. It is also a 212A compatible auto-dial, auto-answer modem which supports all Hayes software commands. Even the switch settings are the same, so any software giving recommended switch settings for a Hayes modem can be used, without knowing what the switches do. There is a volume control knob for easy adjustment of the speaker's output. Included in the package is modular phone cable, a cable to hook it to your computer or terminal, and instruction manual. Choose the communications package right for your needs, and you're ready to go!

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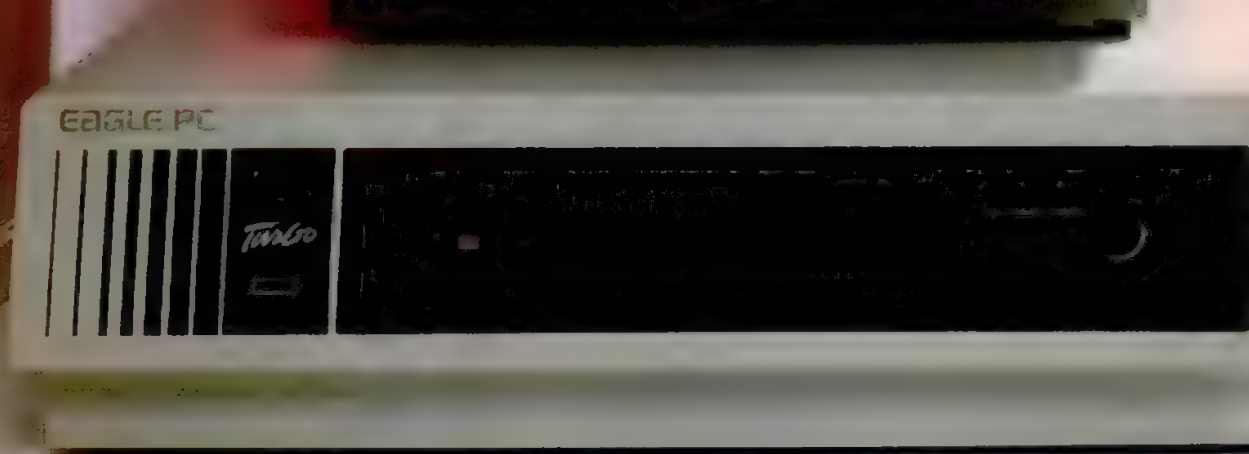
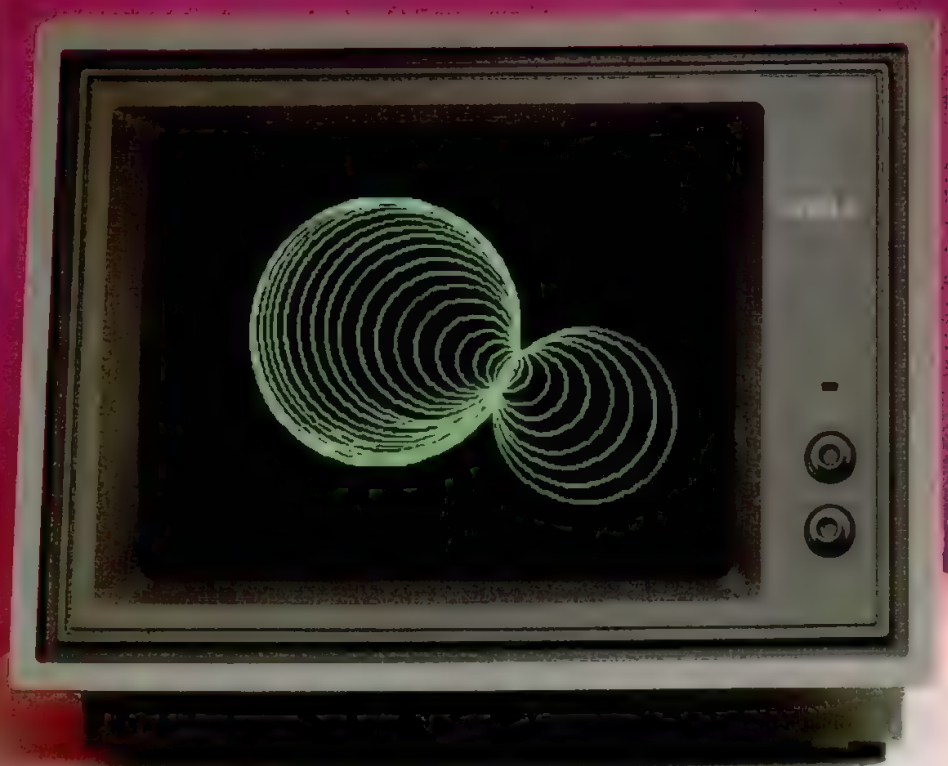
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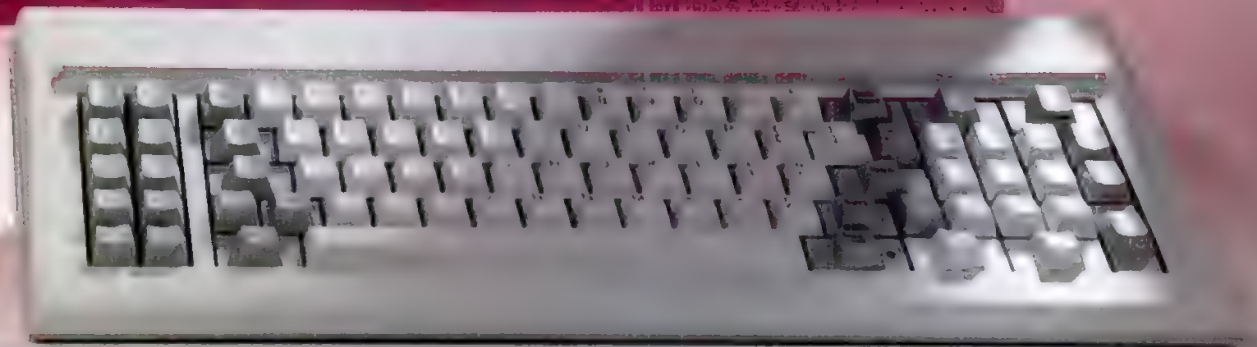
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The new Eagle uses an 8086 CPU with an 8-MHz clock and a 16-bit data path. Compared with the IBM PC's 8-bit (data path) 8088, which clocks in at just 4.77 MHz, the PC Turbo is a very fast engine indeed, even without adding the optional 8087 coprocessor in the empty socket provided for it. In fact, it is so fast that Eagle had to include a front-panel pushbutton to slow down operations by inserting extra wait states when required for PC-compatibility. The *Norton SysInfo* diagnostic program rated the speed of the Eagle PC Turbo-XL in its slow mode at 1.4 times that of the PC, and full-bore performance measured 1.8 times the PC's speed.



Eagle PC Turbo

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Eagle PC Turbo-XL (256K high-speed RAM, one 5¼-inch disk drive, and 10-MB hard disk): \$4,995*

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Asynchronous Serial Adapter (COM.1): \$95

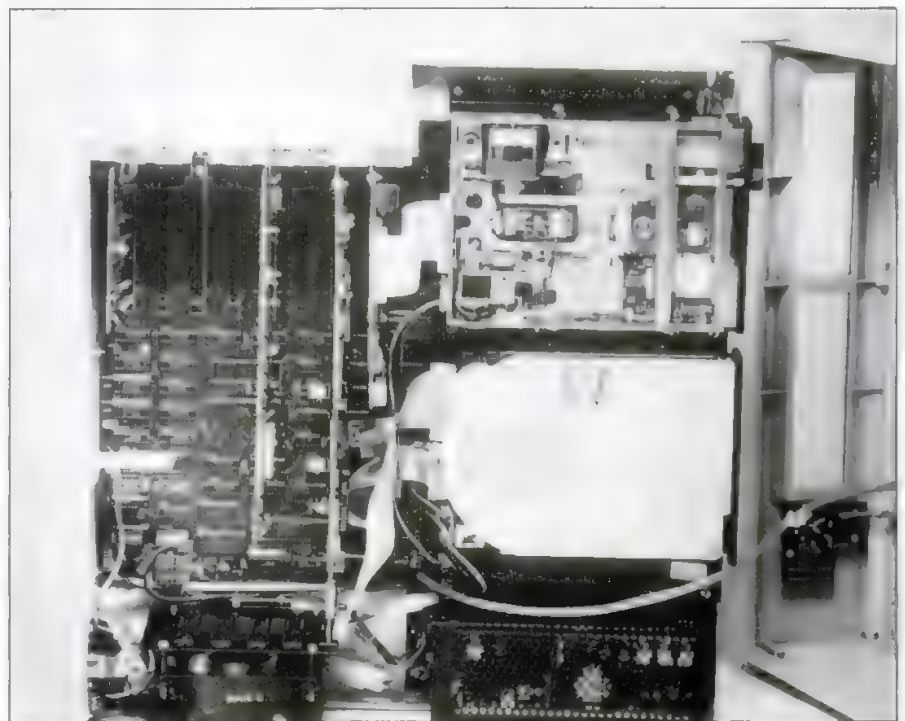
256K Memory Expansion kit: \$495

*Prices include keyboard, one parallel port, and DOS 2.1 with GWBASICA.

CIRCLE 712 ON READER SERVICE CARD

Designed to compete with IBM's PC-XT, the PC Turbo-XL I tested came equipped with a 10-megabyte Miniscribe hard disk (a 30-MB configuration is available as the PC Turbo-GT), a 360K 5¼-inch TEAC floppy drive, and 256K of RAM. Unlike the XT, both of the Eagle's disk drives are half height, and the mem-

The motherboard has a remarkably uncluttered look, for its long rows of memory chips are located underneath the half-height drives. In order to add another 256K, I had to take out the drives but was pleasantly surprised to find that they came off together as a unit, with only 6 screws and a few cables to remove. Because the



The motherboard of the Eagle PC Turbo has a remarkably uncluttered look, for its long rows of memory chips are located underneath the half-height drives.

ory chips are faster (150 versus 200 nanoseconds) than the standard IBM issue. Also included with the Turbo-XL were MS-DOS 2.1 and Eagle (that is, Microsoft) BASIC, both with standard manuals and a distinctly readable user's guide.

Opening up the Turbo-XL for video board installation (or just for fun) requires removing only six 6-32 Phillips-head screws. One thing the user's manual fails to mention, however, is that the Fast/Slow switch is anchored to the front of the case, so you must unplug the inboard end of its cable before setting the cover aside.

Eagle's memory is not parity-checked, there are only eight rather than nine chips for each 64K.

The eight expansion slots on the main board run side to side rather than front to back on the motherboard. Access for cable connections is on the side of the machine, recessed behind a magnetically latched door, though the cables themselves feed out to the rear. A metal partition, apparently meant to prevent the unwary hand from coming into contact with live AC voltages, limits the length of two of the expansion slots to 8½ inches; the other six

are full length. On the unit I tested, the floppy-disk and hard-disk controllers occupied two slots; a third was devoted to Eagle's #5027A monochrome display interface, and a fourth held a short parallel printer card. If you purchase the color board, the printer connector (LPT1) is included (as with the IBM PC). Since the main board will hold a full 512K, which is not slowed down to the 4.77-MHz I/O bus speed, and since a clock/calendar module is built into the floppy-disk controller board, there is a reduced need for expansion slots. This is just as well, since the Eagle PC Turbo-XL's power supply is somewhat on the light side: 42 watts at 12 volts, plus another 50 watts at 5 volts. The IBM PC-XT has a 130-watt supply. On the other hand, the Roton "Muffin" fan in the Eagle, unlike its IBM counterpart, is admirably quiet.

Keyboard Fixes

The 84-key PC Turbo keyboard appears to be another cosmetic variation on the Keytronics 5150. It returns to a quasi-Selectric layout by interchanging the left Shift key with the Backslash key and gets the Return key a little closer to its proper position. While this may afford some relief to touch-typists of the pre-PC age, neither "fix" is quite right positionally. The most disturbing aspect of the keyboard, however, was what I judged to be an excessively light touch required for key

actuation. Time and again I found my text littered with accidentally struck characters. Perhaps I could have become acclimated to it in time.

The Eagle's 12-inch green-screen monitor produced a sharp, linear image that was indistinguishable from that of the corresponding IBM display, save that the maximum (excess) brightness was somewhat less. Eagle provides rear-panel controls for vertical hold, size, and linearity as well as for horizontal centering. The disk drive ran at 302 rpm, quite within tolerance, and a *ReadiScope* diagnostic disk showed that the drive would tolerate considerable track offsets from proper positioning. Except as needed to provide the dual-speed clock capability, the PC Turbo chip set was identical to the PC's.

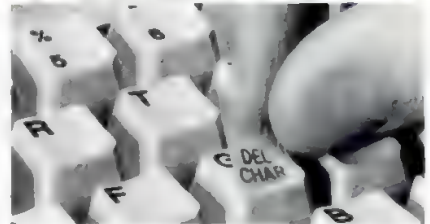
Although rebooting BASICA from drive A: was occasionally necessary to run IBM programs on the Eagle, I found it generally highly compatible. And I had no trouble running our test programs of *XyWrite II plus*, *1-2-3*, and *dBASE II*. The only clue that I was using an Eagle rather than a PC lay in the vastly greater speed of execution, as is shown in Figure 1.

Clearly, the Eagle PC Turbo-XL is a well-designed, faster, and less-expensive emulation of the IBM product. How highly to rate the plusses of this excellent product against any residual concern about the company's long-term future is a question only you can answer. ■

	Eagle PC Turbo-XL—Fast		Eagle PC Turbo-XL—Slow		IBM PC-XT	
	HD	Floppy	HD	Floppy	HD	Floppy
Count to 10,000	0:03	0:03	0:08	0:08	0:10	0:10
Load 100K file	0:03.1	0:11.4	0:04.8	0:14.4	0:05.6	0:11.0
Write test	0:17	2:33	0:17	2:33	0:19	2:32
Read test	0:10	1:24	0:10	1:30	0:11	1:29
Sort 1,000 records	0:35.8	0:37.6	1:02	1:05	1:06	1:08
Recalc spreadsheet	1:55	1:55	3:41	3:41	4:00	4:00

Figure 1: Comparison tests for the Eagle PC Turbo-XL (in both fast and slow modes) versus the IBM PC-XT.

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CIRCLE 295 ON READER SERVICE CARD

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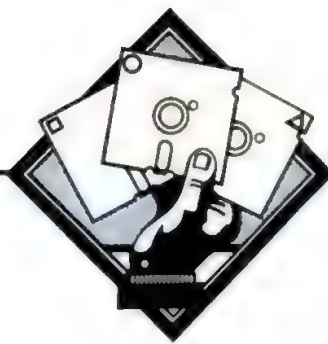
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PROJECT MANAGEMENT WITH THE PC



In this last segment of our three-part series on project management software, we review Level II and III packages. We initially divided the project management programs into three categories based on the functions provided by the products. The 24 Level I software products, which were reviewed in the previous two issues, help you plan single projects. Level II software programs provide you with project control by generating progress reports based on planned tasks and resources. Level III packages allow you to coordinate several projects that share common resources and work breakdown structures.

Level II and III software packages are not necessarily more sophisticated, expensive, or better than Level I products. In fact, some of the planning capabilities of Level II and III products are inferior to those of Level I products. The notable distinction between the different levels is whether or not you want automated project control. To control a project using Level I software, you need to input revised schedules to show completions and new forecasts—that is, you have to replan, using actual and forecast data to replace planned data. On the other hand, you get project control with Level II and III software by simply inputting progress based on tasks and utilization of resources and then allowing the system to compute



planned versus actual variances, revised networks, and new budget and schedule totals. Level II and III packages keep original and revised plans from being lost when overlaid with actual and forecast data. You will appreciate the ability of Level II and III software to store these extra data elements because you would otherwise have to use manual methods to contrast your progress with your original plan—a very time-consuming task.

The best project control systems keep track of four input elements: the original plan; the revised plan, which reflects agreed-upon changes because of rescoping of the work effort, changes in methodology, or resource changes, such as personnel switches; forecast plan, based upon remaining-to-complete estimates by team members on their last progress report; and the actuals, such as task completion dates, actual event dates, work time spent on active tasks, and resource consumption quantities. The programs then calculate variances of the revised plan from the original plan for project planning and compare the actuals to the revised plan and the forecast plan to the revised plan for project control. Project task networks are recalculated and redrawn for project control with actual and forecast data.

Level III software is aimed at companies primarily organized around projects and interested in standardizing the planning, control, and analysis of their projects around a single system. Until recently, this process was possible only with mainframe software. The two Level III products described in this issue may be the beginning of a trend in this direction.

If you are managing a project beyond the planning stage, you should seriously consider one of these Level II or III packages.—Ken Edwards

LEVEL II

PAC MICRO: KEEPING PROJECTS ON TRACK

PAC MICRO, Version 1.21

AGS Management Systems, Inc.

880 First Avenue

King of Prussia, PA 19406

(215) 265-1550

List Price: \$990**Requires:** 128K RAM, one disk drive.

CIRCLE 721 ON READER SERVICE CARD

PAC MICRO is a standalone project management package offered by AGS Management Systems, a software giant that produces project management systems for mainframes. PAC MICRO offers several good features. These include the ability to track actual progress against the original project plans and to present the comparison in two ways: as a typical printed report, or as a bar graph. Another feature is the ability to produce a network diagram of a project.

There are other, less expensive packages, such as Scitor's *Project Scheduler 5000*, that perform as well as PAC MICRO in many respects. If, however, you need to interface with AGS's mainframe PAC II or III systems, PAC MICRO may be your best choice.

PAC MICRO is not copy protected. Installation is easy and takes only a few minutes. Clear instructions are provided in the reference manual, which has a well-thought-out format that walks you through the program step by step. Almost every page shows a screen display, with the proper keystrokes clearly indicated. How-

ever, the manual does not provide a reference section. This omission is unfortunate, since the program is a hefty one, and the tutorial format alone does not provide adequate information on the program.

The Case Study

The manufacturer did not furnish a copy of the full *PAC MICRO* program for review. A demonstration disk was provided, but since it allowed only ten activities to be entered, I was unable to put the program through the paces of the full case study. Another restriction on the demo disk was that no project data could be saved. Otherwise, the program seemed fully functional.

PAC MICRO correctly calculated the critical path for my ten-activity case study project, then allowed an activity to be deleted and correctly adjusted the rest of the project. However, with the demo ver-

menu of the newer version.

The reports include a list of activities by criticality, a list of predecessors and successors for each activity, and a Gantt chart. Activity lists can be sorted on several fields, including early start date, late start date, and resources. The duration of each activity versus the duration of the project as a whole is shown by a pie chart (see below). Unfortunately, the pie charts cease to be effective when divided into

more than a dozen or so sections.

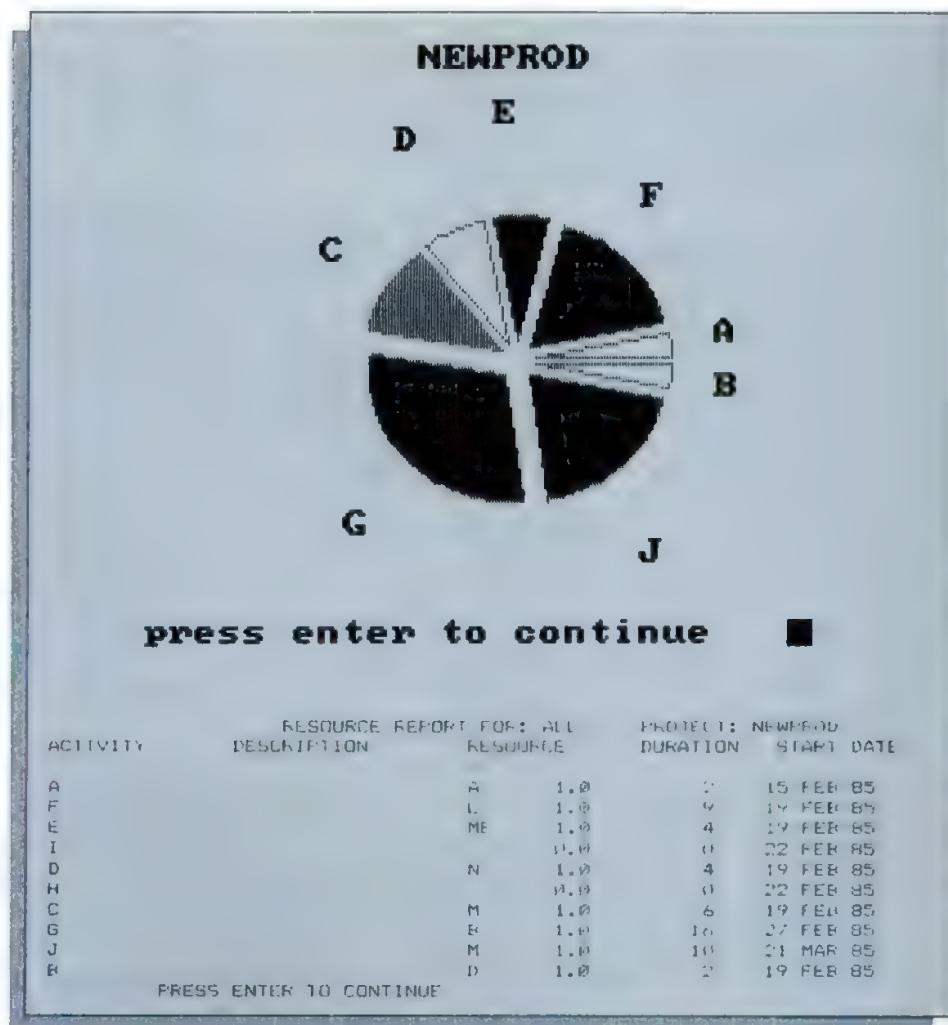
It is necessary to exit the main *PAC MICRO* program to produce a network diagram of a project. Since I could not save my project data, I was unable to test this feature. A demonstration project provided on disk was, however, clearly drawn and readable when dumped to the printer.

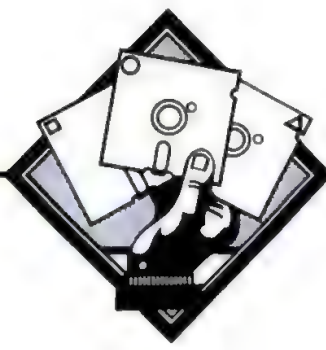
PAC MICRO is menu driven, and it is easy to set up a project. First you select the

THE PAC MICRO
REFERENCE MANUAL
HAS A WELL-THOUGHT-
OUT FORMAT THAT
WILL WALK
YOU THROUGH THE
PROGRAM STEP BY STEP.

sion I tested, the only way to print a report was to use the Shift-PrtSc key combination, which necessitated frequent dumps. Thus a 200-activity project would require ten screen dumps to be printed. (According to the manufacturer, a report-printing feature is now offered as an option on the

● *PAC MICRO's* graphic representation of activity duration, presented in pie-chart format.





time unit, in either hours or days. Next, you build the project by using a simple activity entry screen that allows you to enter the activity ID and description, the "phase ID" (which can be either a specific phase of the project or any two-digit code), the duration of the activity, and up to three predecessor activities. However, the activity entry screen does not let you see which activities you've already entered, nor does it number activities consecutively. It's easy, therefore, to lose track of which activity to enter next.

Resources are entered from a separate menu option. After you create a master list of resources and their associated costs, you can assign the resources to each activity of the project. This creates extra steps for the user. Much time would be saved if the resources could be entered together with each activity, instead of going through an entire project twice.

Once you assign resources to each activity, the Resource Module can list all the activities assigned to each individual resource. The program can also produce a column chart that shows, by resource, the number of resource units required on each project day. Thus you can easily see on which days you have over-allocated a resource.

PAC MICRO is available with a Cost Module that helps you track the budgeted and actual costs of a project. Like the Resource Module, costs are entered after the activities. The cost information can be produced in a report or displayed in a format that graphically compares the projected and planned data on an activity-by-activity basis.

Summary

PAC MICRO goes beyond simple project planning by allowing you to enter

actual activity costs and durations and then compare actual to projected data. The program displays a bar chart showing each activity's budgeted versus actual costs, projected versus actual durations, and projected versus actual use of resources. This graphing feature provides an easy way to find potential trouble spots.

PAC MICRO performs many of the functions necessary to manage a project effectively over its lifetime. It also interfaces with *PAC II*, *PAC III*, and *Estiplan* (see review of *Estiplan* in this issue). *PAC MICRO* is a good package that attempts to do everything project management software should do.—Diane Burns

PLAN/TRAX: WAIT FOR VERSION 3.0



PLAN/TRAX, Version 2.0

Engineering-Science, Inc.

57 Executive Park South, NE, #590

Atlanta, GA 30329

(404) 325-0124

List Price: \$595

Requires: 128K RAM, one disk drive.

CIRCLE 794 ON READER SERVICE CARD

PLAN/TRAX (*PT*), a well-designed software package, combines elements of both project planning and control. It produces a large number of useful charts and reports and makes good use of the graphics features of the most popular dot matrix printers. The current version of *PT* lacks some advanced features and has poor documentation, but Engineering-Science, Inc., promises to release a much improved version soon.

PT requires no installation procedures; the program runs right out of the box. However, since *PT* is copy protected and was not written with disk space reserved for DOS, it is not a self-booting program, so it must be loaded from the A> prompt. Each package comes with an original disk and a backup, with replacement copies available for \$20 each.

Documentation is the weakest element in an otherwise workmanlike program. The manual offers resolutely unclear instructions, but I found that they can be

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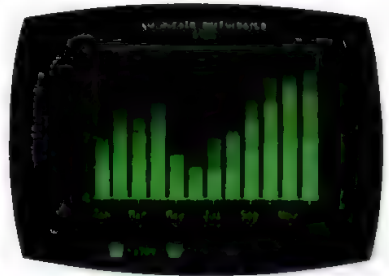
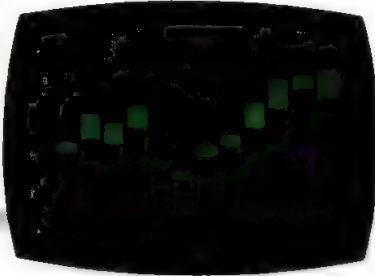


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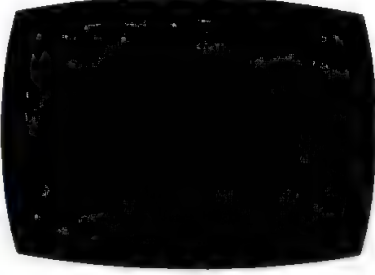
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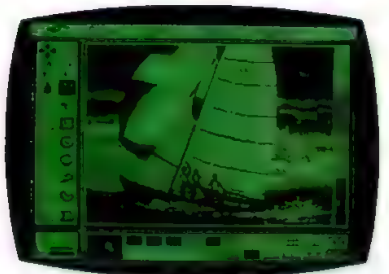
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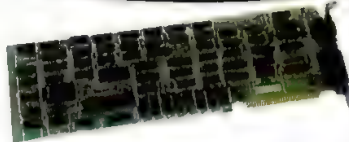
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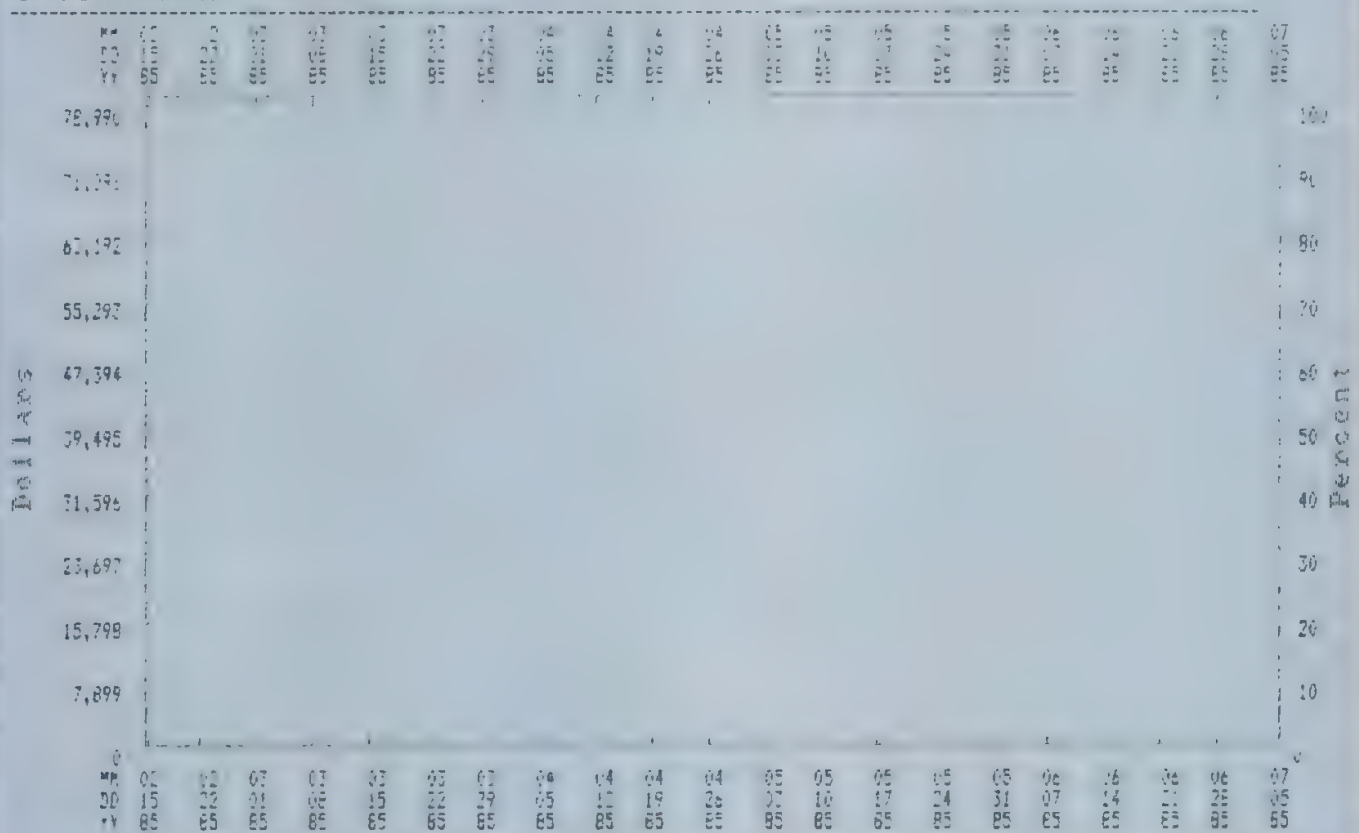
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Projected Expenditure Profile

Project Managers, Inc.
555 Baloney Boulevard
New York, N. Y. 10022

Lemon Computer Company
...
Project Manager: Fred E. Neuman

RUN TIME: 00:44:11 ** 02-17-1984



● This helpful schedule graphically represents cumulative project costs.

deciphered with persistence. A worse problem is error messages; not one is documented. Moreover, the manual omits some crucial bits of information, such as the fact that *PT* needs a graphics adapter to

run and that a Ctrl-Break key combination will dump you out to DOS at any time.

Once you know how to use it, *PT* runs smoothly. Data input is straightforward. It takes about 1¼ hours to key in the test data, but the program can't handle a couple of items. For example, *PT* does not recognize half days, so you have to round

up short activities to a full day. Also, *PT* does not have an internal calendar and has no way of accounting for holidays or weekends.

Once all the case study data were in, *PT* refused to calculate the critical path, complaining that there were too many beginning and end nodes. It was baffled by the

PROJECT MANAGEMENT

PROJECT SCHEDULE

Project Managers, Inc.
555 Madison Boulevard
New York, N. Y. 10022

Lemon Computer Company
100
Project Mgr: Alfred E. Neuman

RUN TIME : > 00:29:32 ** 08-17-1984

	MM	DD	YY	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	00	15	85	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
	YY	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	
Initial Screening																																		
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Sales Suggestions																																		
Motivation Research																																		
Research and Development on Model																																		
dummy																																		
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Build Crude Model																																		
Executive Reactions																																		
Estimate Market																																		
dummy																																		
Estimate Competitive Behavior																																		
Estimate Market Potential																																		
Estimate Distribution Costs																																		
Estimate Advertising Costs																																		
Estimate Manufacturing Costs																																		
Price vs. Demand Curve																																		
Preliminary Financial Analysis																																		
Consumer Reactions																																		
Preliminary Price Range																																		
Check Product Non-violation of Patents																																		
Review Manufacturing Facilities																																		
Full Scale Test Decision																																		
Complete Product Design																																		
Buy raw Materials																																		
Sampling Techniques																																		
Preliminary Advertising Copy																																		
Preliminary sales plans																																		
Determine Financial Needs																																		
Equipment for Manufacturing																																		
Engineering Lab Test																																		
Set-up Samples for Market Testing																																		
Market Test Corps Prepared																																		
Preliminary Media Evaluation																																		
Manufacture Models																																		
Get Interviewers																																		

(Chart continues)

Investigate Distribution
Financial Forecast
Train Interviewers
Market Tests
Code and Labelate Test
Evaluate Test Results

Improve Product
Investigate Names and Labels
Establish Quality Control
Investigate Patent Application
Plan Manufacturing
Management Go-Ahead Decision
Patent Application Submitted
Determine Seasonal Demand
Set Advertising Budget
Evaluate Media
Select Name
Select Sales Manager
Establish Prices
Select Advertising Copy
Establish Prices
Select Promotional Aids
Select Media
Design Label and Trademark
Financial Funds Flow Forecast
Equipment Purchase
Order Raw Materials
Hire Workers
Set Up Equipment
Receive Raw Materials
Train Workers
Select Distribution Channels
Full Scale Manufacturing
Establish Distribution Channels
Determine Service Needs
Sell to Outlets
Ship to Distributors

Introduce New Product

(Chart ends)

● **PLAN/TRAX** has one of the more professionally drawn (and hence legible) Gantt charts.

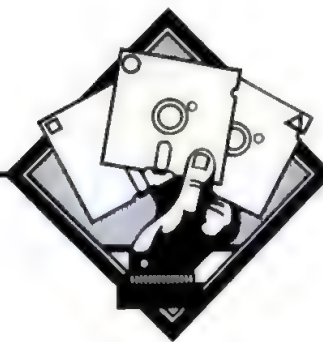
PC test's node 43, which cannot be traced back to node 1, and with such nodes as 51 and 52, which do not flow into the final node. At a time like that, an error message

index would have been helpful. Instead, I had to call Georgia to resolve the problem. Nevertheless, once all these loose nodes were connected by dummy activities to the first or last node, **PT** correctly determined the critical path in about 90 seconds.

PT produces attractive, useful reports. Although it can't draw a PERT chart, it

provides very nice Gantt and manpower-loading charts. It also does a good job on project expenditure forecasts.

It takes only a few moments to delete or insert tasks, either one at a time or in batches. If you need to move several tasks from one project to another, you write a list of tasks out to a disk file and then read



it back into another. The program then correctly recalculates the critical path.

Some of *PT*'s most useful features help you monitor the progress of a project. You can get weekly or monthly reports on your project by entering the amount of money you have spent so far for each activity and how far along you are. The program then prints out or displays half-a-dozen charts and graphs showing whether the project is on schedule or within budget.

One particularly effective report is a Gantt-style chart that shows not only whether each activity is on or behind schedule but also indicates when behind-schedule activities will finally be finished if they continue at their current balky rate. Another plots actual expenditure and percentage of completion against forecast expenditure. It shows at a glance how the project is proceeding.

In its current version, *PT* is a useful program that does a solid job both in project planning and control. However, for \$595, you should get decent documentation and a method for accounting for nonwork days.

Version 3.0, which will run on both color and monochrome systems, will cost \$795 say company officials. It should come with an entirely rewritten manual, a disk tutorial, and many new features, which will reportedly include resource loading and leveling, a calendar that handles weekends and holidays, an increase in the maximum number of activities to 700, and the ability to link projects together. Although it will not produce real PERT charts, Version 3.0 should be able to print out a Gantt-style chart that indicates critical tasks, float time, and task dependencies. If the new version lives up to its billing, it could be a real contender.

—Jared Taylor

PMS-II: A STRICT TASKMASTER



PMS-II, Version 6.2

Aha, Inc.

147 South River St.

P.O. Box 8405

Santa Cruz, CA 95061-8405

(408) 458-9119

List Price: \$1,295; *RMS-II*, \$995.

Requires: 128K RAM, two disk drives.

CIRCLE 719 ON READER SERVICE CARD

P*MS-II* is one of the few project management systems for the PC designed to handle very large projects. Although it may take some patience to get it up and running, the system is a valuable tool. The reports it generates are useful for controlling a project's many activities.

Aha, Inc., also offers a companion resource management program, *RMS-II*, that enters and tracks detailed information about each person or job description required for the project.

Getting Started

Installing *PMS-II* wasn't difficult, but it wasn't easy. Beyond simply inserting the disk and typing in *PMS*, you must also be sure that the DOS files *CONFIG.SYS* and *ANSI.SYS* are in your root directory before you can begin the installation.

Don't expect to understand the documentation's installation instructions if you're a beginner or in a hurry. I found the documentation too chatty and missing any clear illustration of the installation steps. Also, the installation program prompts you for information about your system that you might not be able to supply, such as the code that makes your printer to go to the top of the page.

Once installed, you can start *PMS-II* by typing *PMS*. Because the disks are not

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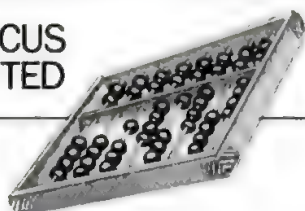
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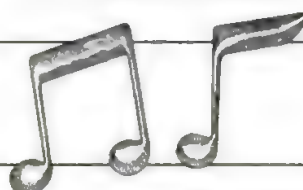


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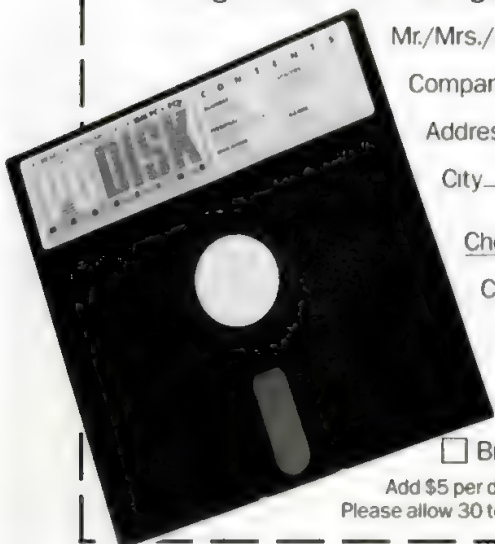
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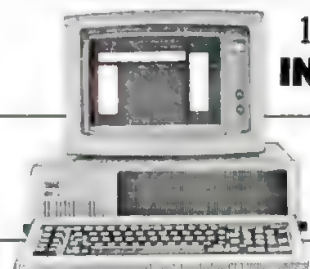
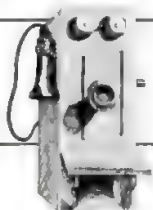
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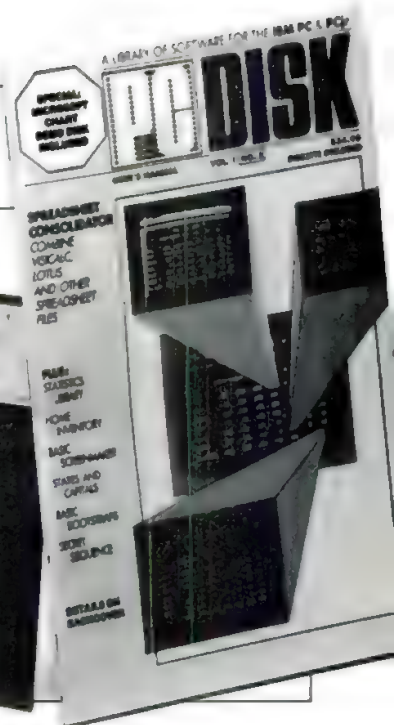


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copy protected, you can store all the necessary files along with the data files on a hard disk. The main menu lists the 14 basic operations available, which are primarily options for creating or updating a network and generating reports.

The Add Activity screen, on which you enter detailed information for each activity, prompts you for each entry. These could be preceding activity number, succeeding activity number, description, estimated duration (best case, worst case, and likely duration), four sorting categories (such as responsibility, department, and job code), current status (start date, finish date, and percent complete), and planned versus actual costs of materials, labor, and overhead.

A sample project comes on the disk to help you see how *PMS-II* works. There is, however, no written or on-screen tutorial.

- *PMS-II's* Activity-on Arrow/PERT chart depicts task dependencies through start and end nodes.

PMS-II is a powerful system you can grow to like as you learn to use it, but it doesn't ease you in.

The Case Study

It didn't take me long to enter the case study. When I was done, I noticed that the menu offered options I hadn't exercised. I tried one called "Link to subsidiary management system," which the documentation said would allow me to enter data on each resource using the optional *RMS-II* program. Although I had installed the *RMS-II* system, I got a fatal error message when I tried this option. A quick call to the manufacturer confirmed that this message was a bug that had recently been discovered and that Aha was correcting it. I requested a new disk, which I received 3 weeks and several phone calls later.

Design

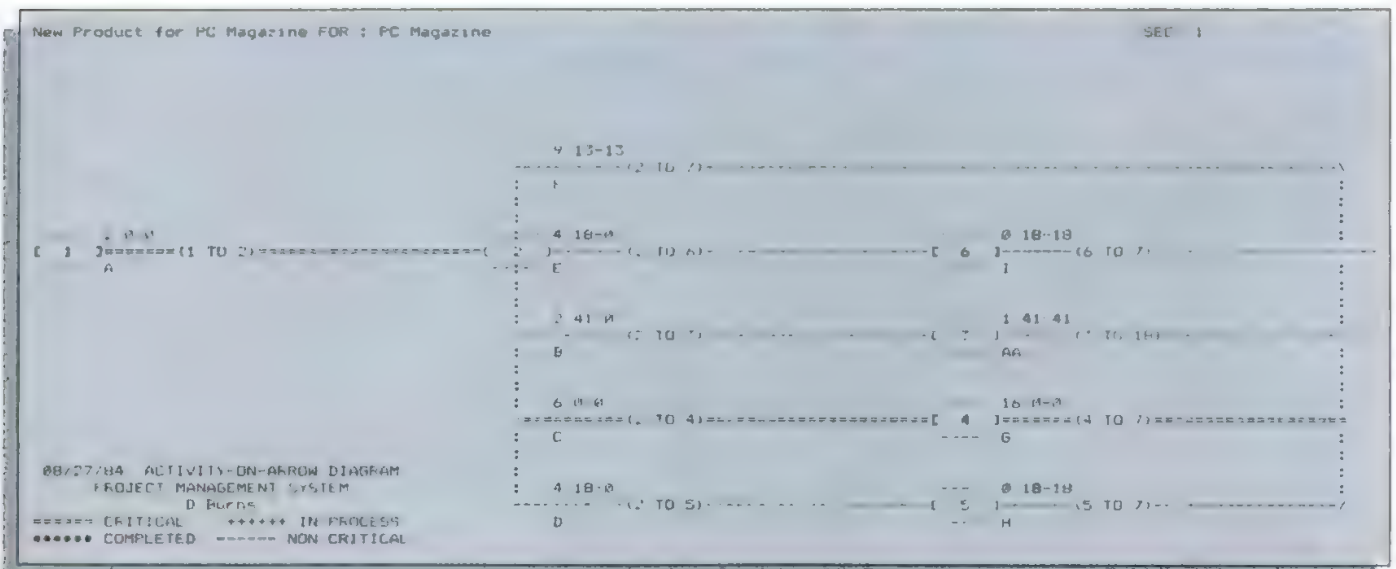
PMS-II can produce more types of project reports than most other systems I have seen. They include network activity

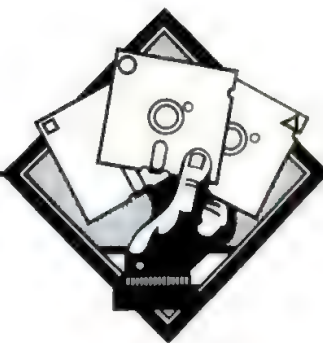
and net change from previous reports, a network edit listing, a PERT chart, a funding schedule, a percent complete report, a subcontractor billing report, or a

**DON'T EXPECT TO
UNDERSTAND THE
DOCUMENTATION'S
INSTALLATION
INSTRUCTIONS IF
YOU'RE A BEGINNER OR
IN A HURRY. THEY'RE
TOO CHATTY.**

Gantt chart. Additional reports are available with the *RMS-II* program.

All of these are printed reports and, except for the activity list, are unavailable on-screen. The designers have apparently assumed most projects you would design with this system are too large to be represented on-screen. One plus is that two





reports meet the requirements for such government contracts as ER-1-1-11 and DOD 7000-2.

The main entry screen is easy to work with, but the screen doesn't tell you which activity you entered last or let you get a quick project summary without returning to the main menu. If you had to take a telephone call just after entering an activity, for example, you can't conveniently tell where you left off.

PMS-II is simple enough to use, but it takes some time to learn if you have only the unindexed manual for help. I suspect organizations that use this package have at least one person who learns it and personally teaches everyone else.

Summary

Without a doubt, *PMS-II* is one of the most powerful project management systems available for the PC. It can handle very large projects and produces many useful reports. Overall, you'll find it a strict, efficient working tool rather than a friendly helping hand around the office. Clearly, much work has gone into making

WITHOUT A DOUBT,
PMS-II IS ONE OF THE
MOST POWERFUL
PROJECT MANAGEMENT
SYSTEMS AVAILABLE FOR
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VERY LARGE PROJECTS
AND PRODUCES MANY
USEFUL REPORTS.

this mainframe-type package fit into the glossier world of microcomputers. More work is needed.—Sharyn Venit

THE PROJECT MANAGER: A PROGRAM WITH PROBLEMS



The Project Manager
John Wiley & Sons, Inc.
605 Third Ave.
New York, NY 10158
(212) 850-6000

List Price: \$495

Requires: 64K RAM, one disk drive.

CIRCLE 793 ON READER SERVICE CARD

The *Project manager*, by Software Projections, Inc, is a simple, batch-oriented program designed to assist you with planning a project by computing a schedule and preparing a Gantt chart based on task information. But it has serious weaknesses that prevent it from being a serious entry in the project-scheduling software market.

Installation takes less than 5 minutes. The system disk is not copy protected, so you just copy the software on a working system disk. Since it is written in BASIC, you must also copy the BASICA interpreter program from your DOS disk. And if you want your disk to be self-booting, then you must also copy the DOS system files. The manual gives you adequate instructions for doing this chore.

Demonstration Data

The *Project Manager* does not include a tutorial, but offers demonstration data on the system disk. Illustrations in the manual show this information as it appears in reports and plots from the system, but

● The *Project Manager's* Gantt chart allows 7 months to be displayed on a page (see p. 214).

Record No. 12 payroll

EMP_NO- LAST_NAME	FIRST_NAME	IN	REGION	OFFICE	STATE	DEPARTMENT
101-099 JONES	ALLEN	D	WEST	LOS ANGELES	CA	LEGAL
301-907 JONES	BETTY	D	SOUTH	ATLANTA	GA	VENT
205-630 JONES	CHARLES	D	WEST	SEATTLE	WA	PROD
402-233 JONES	CHARLES	M	NORTH	CHICAGO	IL	SALES
503-178 JONES	DAVID	D	EAST	NEW YORK	NY	ADM
101-122 JONES	DENISE	J	WEST	LOS ANGELES	CA	PROD
306-281 JONES	FRANCIS	D	SOUTH	FT. LAUDERDALE	FL	PROD
303-927 JONES	FRED	C	SOUTH	FREEPORT	TX	SALES
205-442 JONES	JOHN	A	WEST	PORTLAND	OR	SALES
102-733 JONES	JOHN	D	WEST	SAN DIEGO	CA	ACCT
302-221 JONES	JOHN	D	SOUTH	DALLAS	TX	SALES
104-354 JONES	WILLIAM	D	WEST	WALLA WALLA	WA	SALES
203-775 JONES	WILLIAM	D	WEST	SAN FRANCISCO	CA	ACCT
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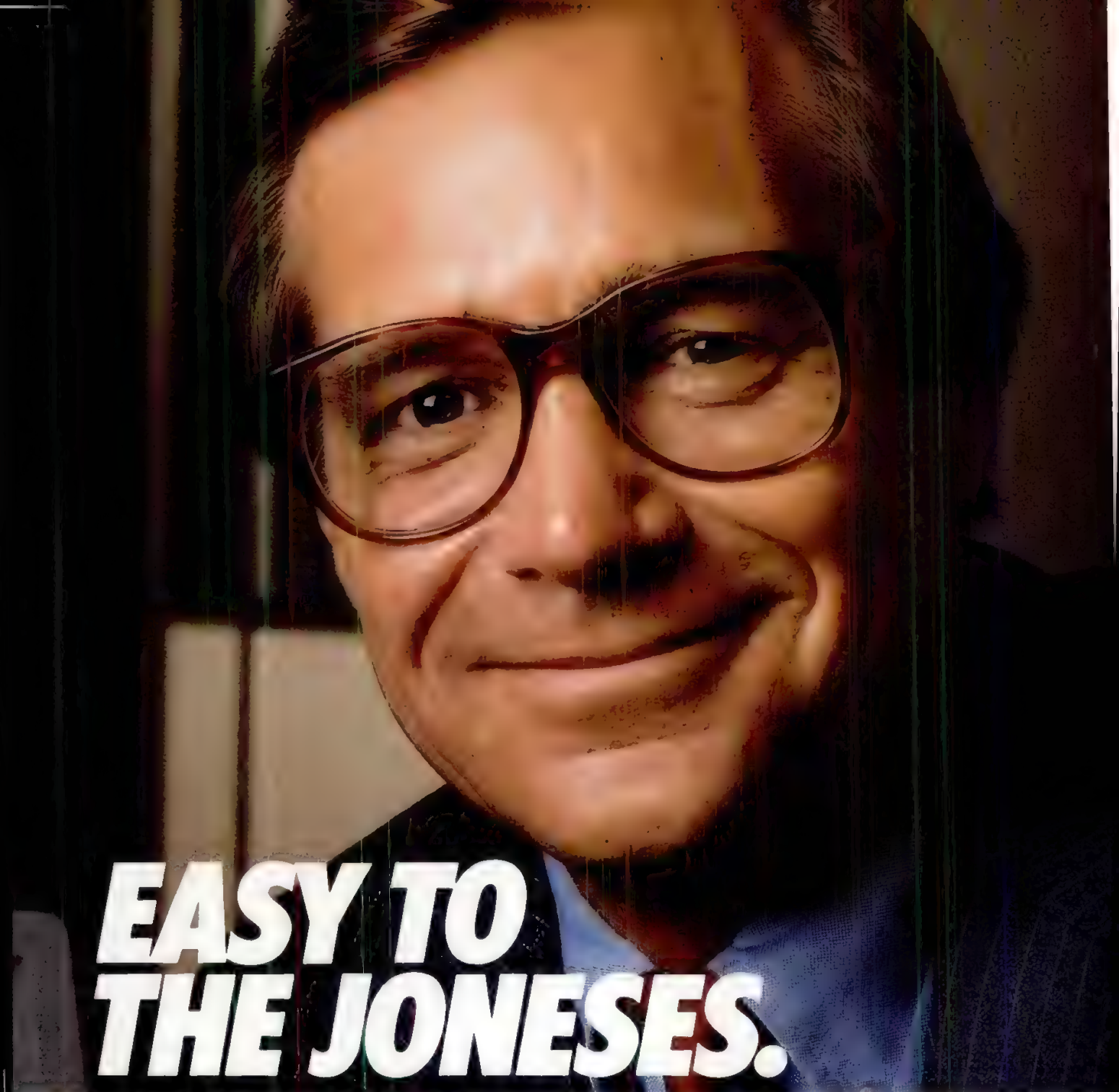
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CIRCLE 210 ON READER SERVICE CARD

START DATE: FEB 15 , 1985

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Initial Sc							
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Motivation	ppppp		CDD4				
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Research &	[[[[[[[[
Dummy	p		4				
Dummy	p		4				
Build Crud			[[[[[[
Executive			p	.4			
Estimate M			ppC4				
Dummy			p.4				
Estimate D			pp4				
Estimate A			pp4				
Estimate M			[[
Consumer R			ppCpDD4				
Estimate C			pC4.				
Estimate M			ppCD4				
Dummy			p.4				
Review Man			pp	CD4			
Dummy			.4				
Dummy			.4				
Price vs D			[[
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Dummy			[
Full Scale			[
Complete P			[[[[[[
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Preliminar			ppp.				
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Set-up Sam			pp	CD4			
Market Tes			pp	CD4			

instructions on using this material to become familiar with the program are not included.

The Project Manager comes with an IBM-size manual of 95 pages. Although it is generally readable and well illustrated, I didn't get a clear impression of what to expect when working with the program. For example, to select the process you want to work with, you use the function keys. The manual explains the processes the keys invoke in ascending function number sequence. However, the manual isn't indexed, so you have to know which function key controls a particular process before you can find the answer to any questions you might have about the operation of the program.

THE PROGRAM HAS NO
FACILITY FOR
ASSIGNING
RESPONSIBILITY CODES
AND COULD NOT
PRODUCE A RESOURCE
LIST, A MANPOWER
LOADING REPORT,
AN ASSIGNMENT WORK
PLAN, OR A PERT
CHART.

The Case Study

Although the PC case study took a little over 2 hours to complete, the data actually took only 35 minutes to input; I've worked with the case study data before, so this time reflects experience on my part. I didn't need any particular preparation for the study because the data was presented in a way that made its entry easy.

The Project Manager uses starting and



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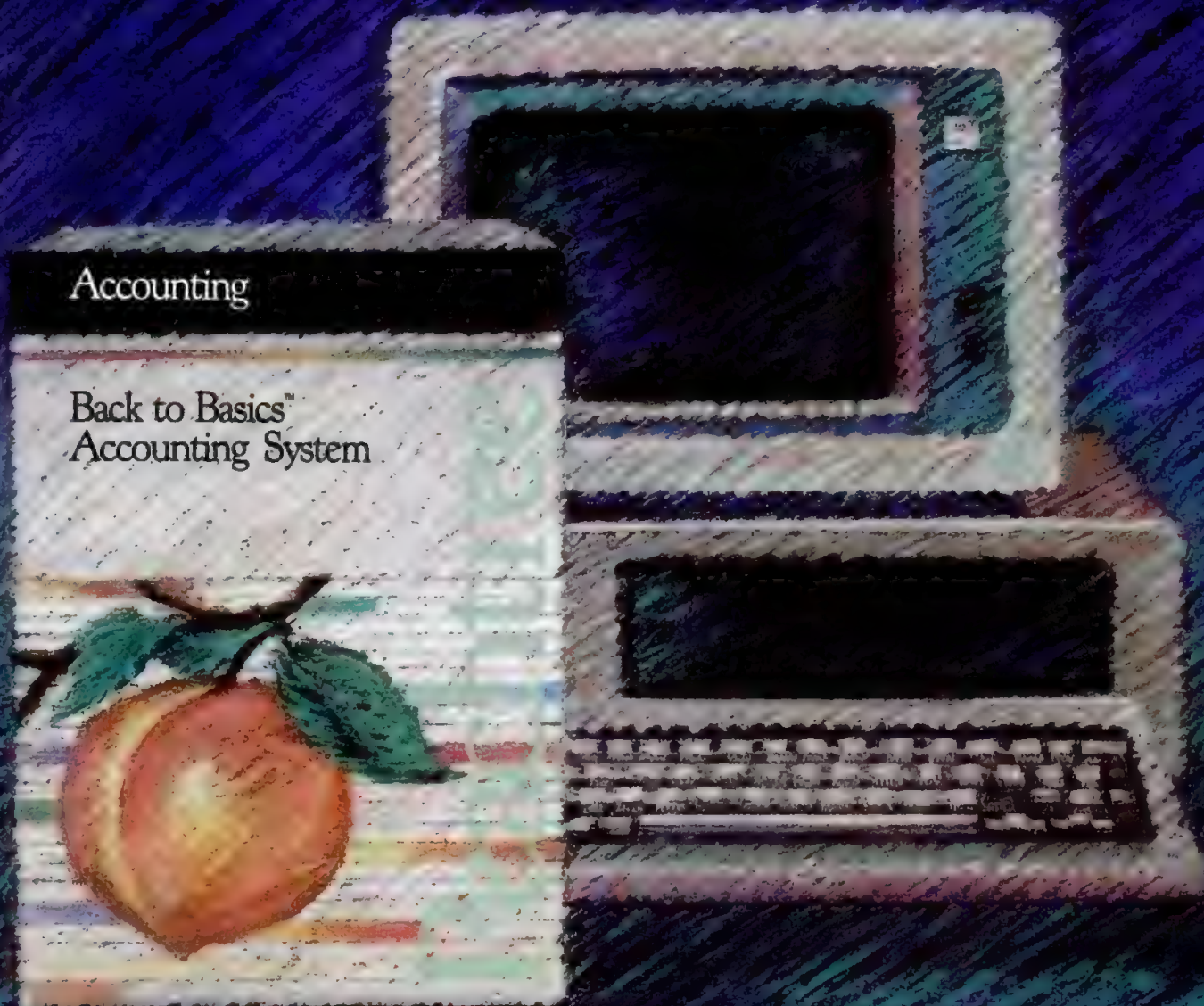
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CIRCLE 358 ON READER SERVICE CARD

PROJECT MANAGEMENT

ending node numbers to identify the tasks that make up a project, thus you must lay out a network diagram of your project before you can enter information into the program. The program easily deletes and inserts tasks because the node numbers define the task dependencies and it does not have to make any adjustments.

This package does only a fair job of handling the case study. While *The Project Manager* forces you to schedule in terms of man-days, it does allow a task duration of less than 1 man-day. However, the program has no facility for assigning responsibility codes and could not produce such reports as a resource list, a manpower loading report, or an assignment work plan. Like most project-scheduling packages, this one could not produce a PERT chart.

On its Gantt chart, *The Project Manager* shows you the entire project schedule across a single 80-column page. It changes the number of columns used to represent a given period of time so all the time units can fit on one page. However, for long-running projects, the time units get so small you cannot determine task start and end dates from the chart.

All of the reports available can be produced either on the screen, a printer, or a plotter. The program claims to support both monochrome and color monitors, as well as IBM/Epson matrix or graphics printers, other printers, and plotters, but I could not find out from the manual how to set up controls for printers other than the Epson or for plotters.

Mixed-Up Dates

The Project Manager does not use a calendar file to determine which date corresponds to a particular day of the week. It allows time in the schedule for weekends.



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CIRCLE 195 ON READER SERVICE CARD

1.2.3

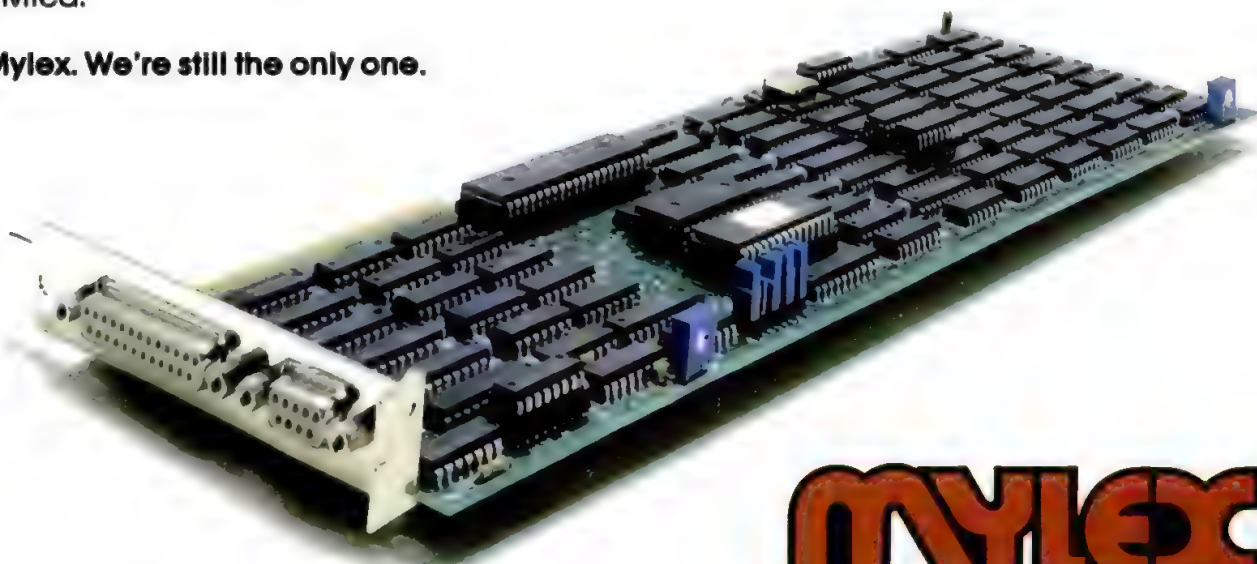
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CIRCLE 372 ON READER SERVICE CARD

PROJECT MANAGEMENT

but I could not determine which dates it thought were the weekends. For instance, the first task in the case study starts on February 15, 1985, a Friday, and takes two days to complete. *The Project Manager* illogically scheduled the task for completion by Sunday, February 17. I guess that it assumes the starting date of a project always represents a Monday.

I believe this package adds little value to the data you put in. All it does is compute start and end dates for each of the tasks and draw a Gantt chart. While the Gantt chart can be displayed on the screen, it cannot be displayed while you are entering or modifying data and is not well

THE MANUAL ISN'T
INDEXED, SO YOU HAVE
TO KNOW WHICH
FUNCTION KEY
CONTROLS A
PARTICULAR PROCESS
BEFORE YOU CAN FIND
THE ANSWER TO ANY
QUESTIONS YOU MIGHT
HAVE ABOUT THE
OPERATION OF THE
PROGRAM.

suited to evaluation of "what if" situations. The program contributes almost nothing to project cost estimation—it only echoes the task costs you originally entered for each task and totals them for the project.

The Project Manager has other weaknesses, which indicate that the authors were careless in their design of the program. For example, the program conducts its data entry in graphics mode, which means it prints only 40 characters across



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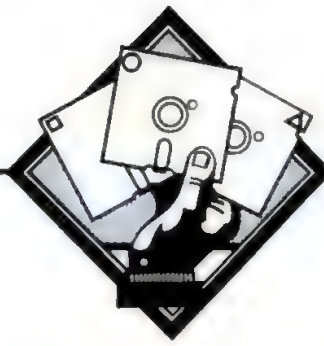
For more information about GOLDENGATE, phone Cullinet toll-free, 1-800-551-4555.

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CIRCLE 193 ON READER SERVICE CARD



the screen. I had trouble adjusting my eyes to such large characters. In addition, the program lacks report headings. *The Project Manager* produces five different reports, including the Gantt chart, and not one report has a title. Each shows the project title, the start date, and the column headings for the fields, but unless you are familiar with the reports, you won't readily be able to distinguish the input data listing from the critical path report or the job start/finish report.

Furthermore, the program does not realign the paper to the top of the page after finishing a report. And it doesn't ask you to do it, either. So, if you don't remember to do a form feed between reports, the reports will be printed immediately following one another, and you will have difficulty separating them.

Getting Less for More

The Project Manager is one of the weakest project scheduling programs I have seen, and at a suggested price of

PROJECT MANAGER WORKBENCH: IN TRANSITION



Project Manager Workbench, 2.0 Advanced Version

Applied Business Technology
Corporation
76 Laight St.
New York, NY 10013
(212) 219-8945

List Price: \$1,150

Requires: 320K RAM, one double-
sided disk drive (two recommended),
DOS 1.1 or 2.x.

CIRCLE 786 ON READER SERVICE CARD

THE PROJECT MANAGER
CONDUCTS ITS DATA
ENTRY IN GRAPHICS
MODE, WHICH MEANS
IT PRINTS ONLY 40
CHARACTERS ACROSS
THE SCREEN. I HAD
TROUBLE ADJUSTING
MY EYES TO SUCH
LARGE CHARACTERS.

\$495, it is also one of the most expensive. Many other programs are available that offer more capabilities and have fewer limitations. —Leslie Brown

Project Manager Workbench (PMW) from Applied Business Technology Corporation (ABT) is an attractive program with some slick features. It deserves a look. The program I reviewed was an interim version of release 2.0; the real 2.0 may be on the market by now. Unfortunately, the PMW sample I looked at still has some rough edges.

Installation

Installing PMW was fairly easy, since I was using a PC-XT. The installation instructions are in an appendix in the back of the manual, and they are fairly clear. One point that I missed the first time through was the fact that the program disk is copy protected; it must be in drive A: every time you load the program. In addition, although the program formerly required 256K RAM, the new version requires 320K.

ABT made the program easy to learn. You get both a demo on disk and a 96-page tutorial in the manual.

I started with the disk demo, as the manual recommends. For the first 15 minutes or so I found it informative and interesting. The demo uses some sort of job control program to automatically demonstrate the different commands on the screen. After a while, however, I began to suspect that something was amiss; the

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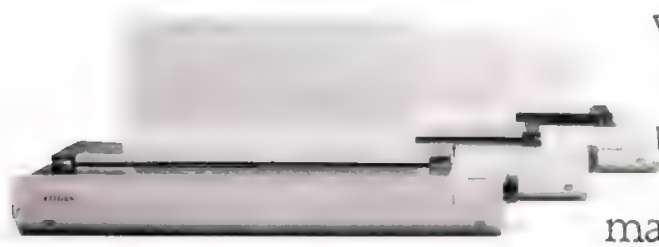
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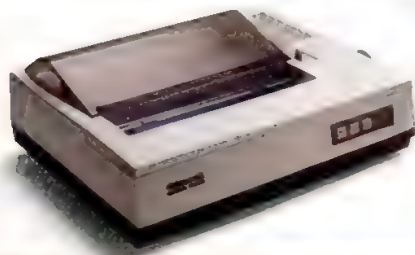


Say hello to the Datasouth Personal Printer—an office-quality dot matrix printer that makes itself right at home next to your personal computer.

Technically speaking, the Personal Printer is "Epson compatible." But it's better than the competing Epson because it also does near-letter-quality printing.

Personally speaking, the Personal Printer is "checkbook compatible." So you don't have to sacrifice the money you need to get the printer you want. And it comes in two models—one with a 10-inch and one with a 17-inch carriage.

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CIRCLE 118 ON READER SERVICE CARD

explanations no longer matched the commands being executed. My conclusion: the demo needs debugging.

I decided to try the tutorial on my own. I found it to be well written, with plenty of examples and screen prints. The tutorial presents each step in small increments; if you are confident in working with your computer, you can easily pick up the pace. I ended up skimming the tutorial by executing only the major examples. Even so, I spent more than 1½ hours getting through the bulk of the material. The tutorial breaks the lessons up into smaller sessions, so you could work through it over a number of days if you prefer.

Documentation

PMW has a great deal of flexibility and power, and the tutorial does not cover every aspect of the program. The References section of the manual, however, explains the program's finer points in detail. It describes each command option and also presents a map of the command structure.

PMW gives you a choice of user interfaces. When you are just starting out, you'll probably want to try the Menu mode, which uses top-line command lines similar to those of Lotus's 1-2-3. Later, if you prefer, you can switch to the Expert mode, where you can issue the commands without having to refer to the menus. The manual clearly explains both modes. I found that the program responded so fast that I was never tempted to leave the Menu mode.

The typeset manual has tabbed dividers between sections. Besides the Tutorial and

● Project Manager Workbench's Gantt chart shows responsibility and task dependency.

:DA:WHO:		
Initial Screening	: 2:1a	!X=vvvvv
Check Product Conformance	: 2:1d	! x#111-v
Industrial Design	: 6:1a	! X111v
Advertising Suggestions	: 4:1n	! x111vvv
Sales Suggestions	: 4:1q	! x111vvv
Motivation Research	: 9:1	! x#1vvv
Research & Development on	: 16:1b	! X1vvv
Build Crude Model	: 10:1a	! (X1)=vvvv
Executive Reaction	: 1:1a	! : x1-111v
Estimate Market Character	: 2:1a	! : xv111#1
Estimate Competitive Beha	: 2:1a	! : x111v
Estimate Market Potential	: 6:1a	! : 1111xvv
Estimate Distribution Cost	: 2:1a	! : x111-v
Estimate Advertising Cost	: 2:1n	! : x#1-v
Estimate Manufacturing Co	: 4:1d	! : X1=v
Price vs. Demand Curve	: 4:1a	! : : X1vv
Preliminary Financial Ana	: 4:1a	! : : (X1/v
Consumer Reactions	: 8:1	! : x--1-v
Preliminary Price Range	: 2:1a	! : : xv
Check Product for Non-vio	: 1:1a	! x-----1-v
Review Manufacturing Faci	: 2:1d	! x--v
Full Scale Test Decision	: 1:1a	! xvvvvvvv
Complete Product Design	: 9:1a	! X11111v
Buy Raw Materials	: 1:1q	! x11111#----v
Sampling Techniques	: 1:1	! x11111vv
Preliminary Advertising C	: 6:1a	! x11111v
Preliminary Sales Plans	: 4:1q	! x11111
Determine Financial Needs	: 2:1a	! x11111v
Equipment for Manufactur	: 16:1d	! x#1111v
Engineering Lab Test	: 8:1a	! X1111v
Set-up Samples for Market	: 4:1a	! x111v
Market Test Forms Prepare	: 4:1	! x111v
Preliminary Media Evaluat	: 4:1a	! x111--v
Manufacture Models	: 8:1d	! (X1vv)
Get Interviewers	: 4:1	! : x1v
Investigate Distribution	: 2:1a	! : x#1v
Financial Forecast	: 2:1a	! x---111-----v
Train Interviewers	: 2:1	! Xv
Market Tests	: 16:1a	! X1v
Code & Tabulate Test	: 2:1	! Xv
Evaluate Test Results	: 2:1a	! : Xvv
Improve Product	: 10:1b	! : x#vv

- This is a manpower loading summary by time period and project team member.

References sections, additional sections explain project management concepts and procedures as well as give practical hints. There are also a number of appendixes. The manual has a table of contents, but, unfortunately, it does not cover error messages. This omission, combined with the lack of an index, presents a bit of an obstacle to using the manual effectively.

Case Study

The case study made *PMW*'s high and low points perfectly clear. On the plus side, data entry is straightforward and flexible. You can group tasks in an outline form, breaking the project into large Phases, which are made up of Activities, which in turn are composed of sets of related Tasks.

One difference between *PMW* and similar programs is that *PMW* requires you to enter tasks on one screen, and then use another screen to describe how they relate to each other. Instead of using network nodes to describe relationships, the program asks you to define Dependencies and builds a map of interdependencies as they develop. This map is a striking, useful way to view the tasks.

Best of all, from the Dependencies screen you may ask for a Network display. This gives you a chart of the task network. *PMW* uses monochrome graphic characters to draw boxes and highlight the critical path with double lines. You can scroll through the chart to look at the different sections; it most likely will not fit on one screen.

On the other hand, I encountered numerous problems with *PMW*'s capaci-

DATE RANGE: BEGINNING TO END		STAFF: ALL											
FILENAME: PCMAG													
		DATE\WHO:	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	
STAFF SUMMARY FOR TOTAL PROJECT													
Team Member a	i i a i	9	10	22	9	17	27	12					
Team Member d	i i d i	2		14	16		4						
Team Member m	i i m i	6	9	19	9								
Team Member n	i i n i	4		2									
Team Member q	i i q i	8		4									
Team Member l	i i l i	9		17	2	2							
Team Member b	i i b i	4	12			4	6						
Team Member g	i i g i	1		1									
Team Member f	i i f i	10											
Team Member e	i i e i	19	4										
UNASSIGNED	i i x i												
TOTAL DAYS	i i i	72	35	79	36	23	33	12					

ty. With 320K of memory, I had room for only 163 tasks. That was enough for the case study, but I ran into a problem when I was entering tasks. I discovered that *PMW* was displaying the titles but not their time blocks on the Gantt chart. I switched from a weekly to a monthly display but soon ran into the same problem. I then found a note in the back of the manual stating that *PMW* can handle projects only up to 19 weeks or 19 months long. Ignoring the start dates, I compressed the project to fit in 19 months. I later found that the display is simply a window on the project and you can shift the frame of reference to show data for additional years. The manual was not clear on this feature.

After I had entered all the tasks, I started to enter the Dependencies. I made it only about three-quarters of the way through before I ran out of capacity. I asked *PMW* to calculate the critical path; it did so in less than 5 seconds. Entering the

data had taken almost 2 hours.

After *PMW* computes the critical path, you have to reconcile possible conflicts with the Gantt chart. The program has a

**PMW'S DATA ENTRY IS
STRAIGHTFORWARD
AND FLEXIBLE
HOWEVER, I
ENCOUNTERED
NUMEROUS PROBLEMS
WITH PMW'S CAPACITY.**

nice feature called Autoschedule, which computes the most effective schedule. It even adjusts for resource loads. *PMW* took only 12 seconds to compute the schedule, and it produced a flawless Gantt chart for the project (at least as far as I had been able to define the Dependencies).

I was in for one more shock, however.

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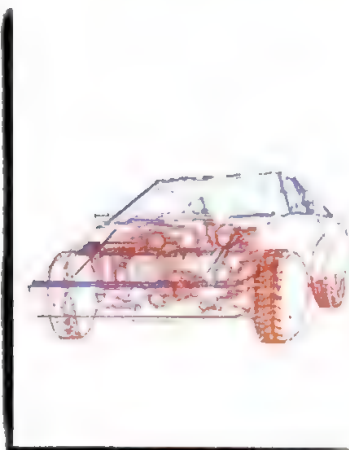
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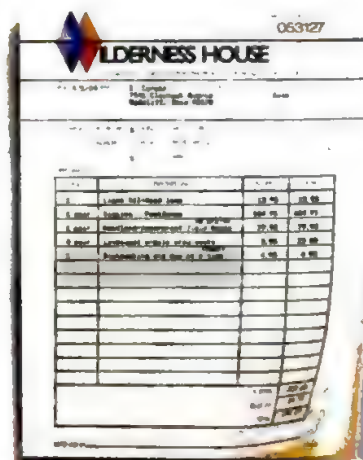
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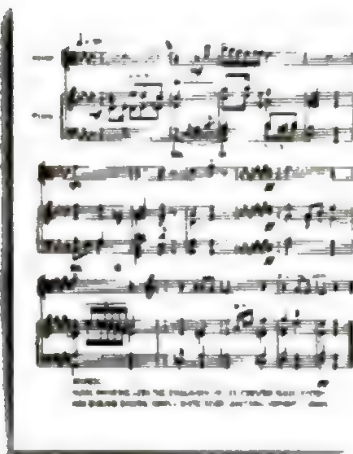
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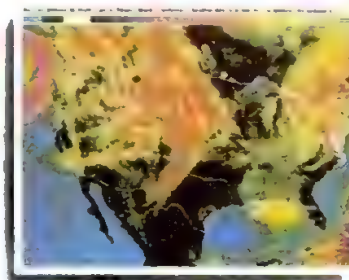
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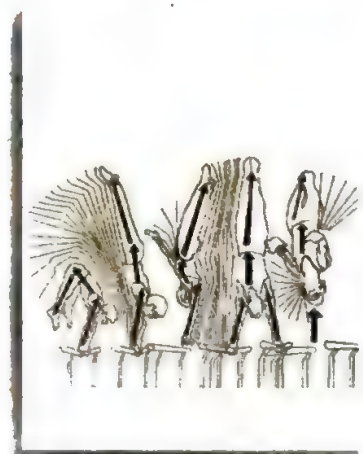
M-200 MATRIX PRINTER



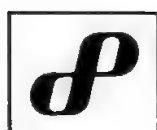
8010 MATRIX PRINTER



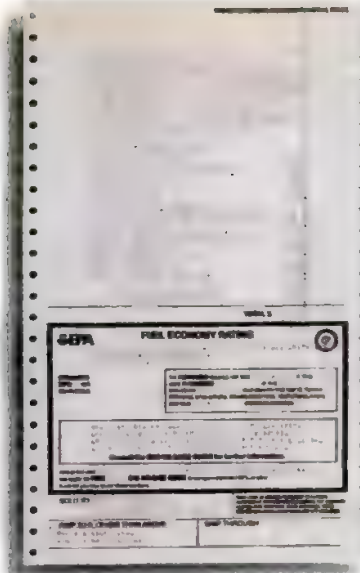
8070 MATRIX PRINTER



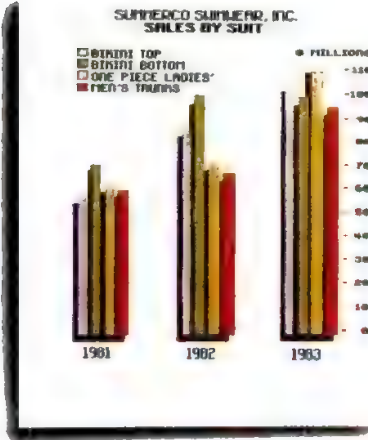
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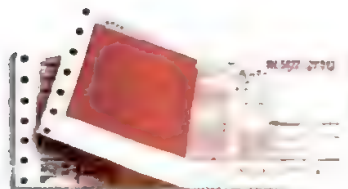
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MEDIUM SPEED BAND PRINTER



8050 MATRIX PRINTER



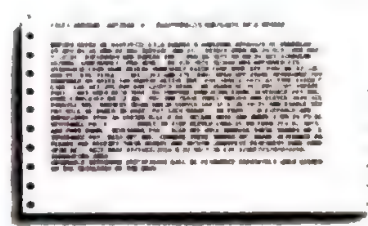
B-600 MEDIUM SPEED BAND PRINTER



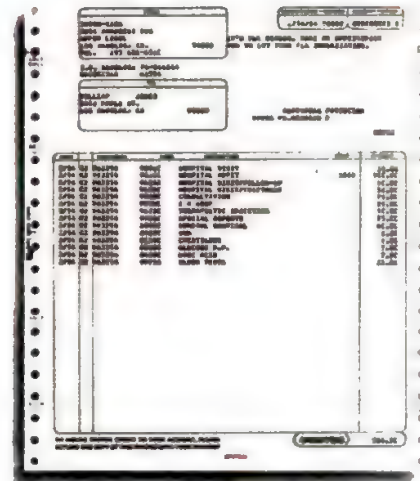
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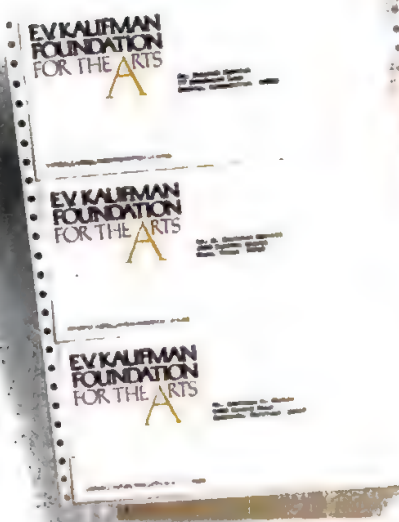
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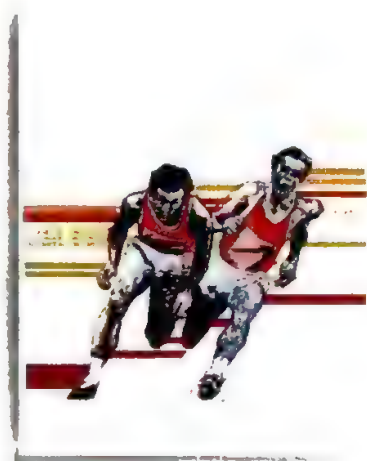
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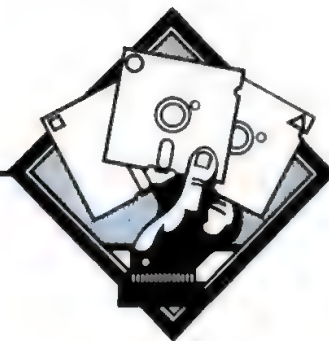
8050 MATRIX PRINTER



DP-55 DAISYWHEEL PRINTER

...and so on.

CIRCLE 105 ON READER SERVICE CARD



When I looked at the Network chart, I found that it could display only the first 20 or so tasks out of a total 73.

The reports were quick and clear. The program supports only a few dot matrix printers, and you will need one that supports the IBM graphics character set if you want to get printouts of the network display. Also, you must use the `PrtSc` key; no report format command prints out the whole report at once.

PMW includes instructions on how to import and export data to other programs, including *1-2-3* and *dBASE II*, using ASCII text files.

ABT has now started to ship the final version of 2.0 for *PMW*. According to a company spokesperson, this version solves a number of the problems I encountered. A virtual-memory design should eliminate the restrictions on the number of tasks and dependencies. The problem with the limited view of the network map should also have been fixed so that you should be able to see all dependencies in network format.

Limited Usefulness

The interim version of *PMW* I reviewed showed promise but was flawed. Although it's a mid-priced product, the program offers some fancy features and fast operation. Unless ABT removes some of the constraints, though, *PMW*'s usefulness is limited. It's too bad the latest release wasn't available in time for this article, since it promises to solve these problems and more. If ABT makes good on its claims, *PMW* may turn out to be a good value. At any rate it deserves a good look. A live demonstration version is available, including the complete manual. Try out the improvements for yourself.

—Alfred Poor

QWIKNET: TOO QUICK WITH PROBLEMS



Qwiknet

Project Software & Development, Inc.
14 Story St.

Cambridge, MA 02138

(617) 661-1444

List Price: \$800

Requires: 320K RAM, two disk drives.

CIRCLE 789 ON READER SERVICE CARD

Qwiknet is an ambitious and innovative project-scheduling and management program. Unlike most project-scheduling programs, it draws a limited network chart, in addition to Gantt charts and printed task listings, which are more common among software of this type. Be forewarned, however—*Qwiknet* was just released in July on an introductory basis, and it still contains some major bugs.

A Faulty Installation

Qwiknet is copy-protected and requires an installation procedure, which is well documented in the reference manual, with separate sections for both hard disk and floppy disk systems. However, the program used to install the software can be run only once. If you try to run it again, it asks you to supply a verification number, which you can obtain by calling the manufacturer and justifying your need for another installation. In case of problems, your backup is the master disk, which functions properly by itself. The installation procedure would not work for me, so I had to use the master disk as my working system disk. Theoretically, the installation

● *Qwiknet's Gantt Chart provides space for relatively lengthy task descriptions.*

RUN DATE 24-Sep-84

WORKING SCHEDULE

PROJECT START 15-Feb-85

PROJECT newprod

Lemon I Product Introduction

DATA DATE 15-Feb-85 PAGE 1

ACTIVITY NUMBER	DESCRIPTION	X = remaining portion		F = finished portion		+ = float		* = zero length	
		24-Sep-84	31-Dec-84	08-Apr-85	15-Jul-85	21-Oct-85			
A	Initial screening			X++++++					
AA	Check prod. non violation of patents			X++++++					
AB	Review manufacturing facilities			X+					
AC	Full scale test decision								
AD	Complete product design			+					
AE	Buy raw materials			+					
AF	Sampling techniques			+					
AG	Preliminary advertising copy			+					
AH	Preliminary sales plans			+					
AI	Determine financial needs			+					
AJ	Equipment for manufacturing needs			+					
AK	Engineering lab test			+					
AL				+					
AM	Set-up samples for market testing			+					
AN	Market test forms prepared			+					
AO	Preliminary media evaluation			+					
AP				+					
AQ	Manufacture models			+					
AR	Get interviewers			+					

should take only a minute or two.

Qwiknet does not include a tutorial or a sample project. You learn the program by following the manual, which is organized

QWIKNET CANNOT COPE WITH AN INTERRUPTION WHILE PRINTING A REPORT, SUCH AS PAPER RUNNING OUT OR TEARING.

in the sequence you would normally follow to put a project on the system, or simply by exploring the menus and options on your own. The program is menu-driven and uses windows, so it isn't hard to find your way around.

The reference manual is well organized, readable, and easy to use if you start at the beginning and read along as you put in your first project. Its index does help you find particular topics, but it needs to be more detailed. Overall, the manual is quite adequate, but it is not as comprehensive as some other manuals I have seen.

The Case Study

If everything had worked correctly, the case study should have taken about 4 to 5 hours. However, I encountered problems that required me to start over a total of 4 times, and I eventually ran into a problem that prevented me from even completing the study.

Because of the program's scope, data entry took longer than usual. As with most packages of this type, the holiday calendar and the resources list are separate data entry steps. However, *Qwiknet* has sepa-

rate data entry windows for the tasks, the dependencies between tasks, and the assignment of resources to tasks. The data, which took an hour to enter on other systems, took 2 hours and 15 minutes to enter on this one.

Qwiknet performs only moderately well in producing the reports required by the case study. The program produces five reports: a listing of basic task information; a listing of the task schedule; a bar graph, or Gantt chart, of the task schedule; a listing of the target schedule; and a bar graph of the target schedule. On the screen, it produces a listing of scheduled task information, including costs, but it won't print out. It also produces a dependency graph, but, once again, only on the screen and only showing the predecessors and successors to a given task. *Qwiknet* does not offer a report showing a schedule of funding or manpower loading.

Bonus Features

Qwiknet provides many features that are not required by the case study. For example, it can schedule backward from a target date. You can subject each task to one of several possible constraints, such as not finishing later than a particular date or not beginning prior to a particular date. You may also apply several resources, including both labor and materials, to a particular task.

In addition, the costs of the resources can be applied as a lump sum at the start of a task, a lump sum at the end of a task, a fixed amount distributed evenly over the duration of the task, or a fixed rate per day of duration. *Qwiknet* tracks three different project schedules and costs: estimated, target, and actual. *Qwiknet* provides a lot of support for project management, as well as to project scheduling.

The program is also very fast. Very few operations showed any delay from instantaneous response, and if there was a delay, it was very short. For example, the computation of a schedule composed of 84 tasks based on intertask dependencies takes just a couple of seconds. The printer causes the only real delay because you have to wait for the printouts before you can continue with other processing. Each of *Qwiknet*'s reports takes 5 to 7 minutes to complete.

Window Dressing

Qwiknet makes extensive use of color and windows and is designed to be used with a mouse. The windows can be moved anywhere on the screen. The size of the window can be made larger or smaller. Although the normal colors for the windows make it easy to distinguish several windows on a screen, the program lets you alter the color of the top window. Since each one was the top window at some stage, this gives you effective control of the color—a feature that would be useful if you were preparing a slide presentation from screen photographs of screen images. *Qwiknet* also includes a screen dump facility, which will print whatever is on the screen. However, the graphic characters are not truthfully translated, and the result, though usable in a working context, is not handsome.

While involved with the case study, I was chagrined to discover that *Qwiknet* cannot cope with an interruption while printing a report, such as paper running out or tearing; it goes into a loop that locks the keyboard. And the only way I could get started again was to power down and start over. Moreover, I couldn't always retrieve partially completed projects because, once again, *Qwiknet* goes into a

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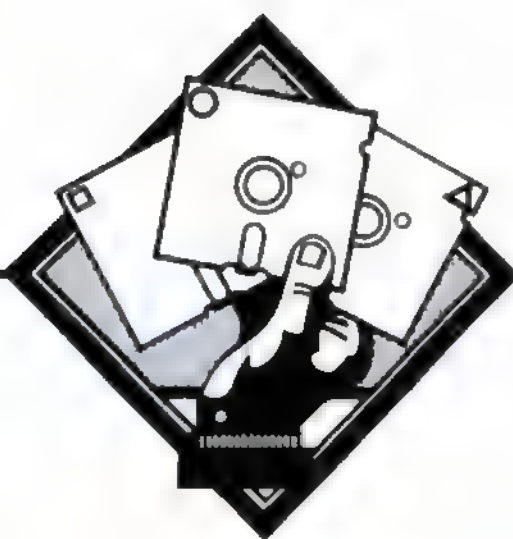


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CIRCLE 229 ON READER SERVICE CARD

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loop that locks the keyboard.

The first program session in which I used the mouse, it functioned perfectly. For the next session, the mouse would move the pointer around, but the buttons wouldn't work—I have no idea why. Ultimately, I got as far as I did with the case study by doing the entire thing in one program session and tending the printer very carefully. Another problem, which is a relatively small one compared to the others, involved the spacing for the reports; the program does not allow the normal top and bottom margins of other programs. Of the 66 possible lines on a page, *Qwiknet* wants to print 64 of them. I couldn't align the paper accurately enough to prevent the program from skipping an extra page between successive pages of the same report.

The Ultimate Quirk

The problem that prevented me from completing the case study involved deleting and re-adding a task. When I removed a task, the program seemed to lose track of the task dependencies when it computed the schedule. The tasks prior to the one deleted were scheduled correctly, but all the others were scheduled without any dependencies. When I tried to add the ones that were missing from the schedule, the program told me that my additions duplicated dependencies already on file. At that point, after all my other difficulties, I gave up.

Because *Qwiknet* has so many good features, my disappointment with it is all the more pronounced. I hope the problems I encountered will be corrected in a future release. *Qwiknet* has the potential to be a very good package some day, but, as of this writing, I don't believe it's a good package yet. —Leslie K. Brown

TASK MANAGER: A TOUCH OF PANACHE



Task Manager, Version 1.09

Quala
23026 Frisca Dr.
Valencia, CA 91355
(805) 255-2922

List Price: \$395

Requires: 128K RAM, one disk drive.

CIRCLE 795 ON READER SERVICE CARD

The aptly named *Task Manager* does just what its name implies—it manages tasks. Like most project management software, it doesn't do everything but what it does do is accomplished with a touch of panache, which is unusual for its class.

Much of *Task Manager's* extra flexibility derives from its underlying structure. The program is designed as a database manager specifically customized for project management. While any project manager can be considered a form of database program if it handles data entry, editing and deletion of data, and production of output reports, *Task Manager* brings the power of a traditional DBM to the project management realm. The various elements of the task definition are considered fields in a database, and indexing and sorting can be used to produce an incredible variety of reports.

Good User Interface

Task Manager shines because of its good user interface. The product is totally menu-driven, but two more important distinctions are its elegant input screens and the ease of data entry. The program draws boxes to hold field entries and indicate the acceptable length of each field. In addition, *Task Manager* checks all user input and won't accept invalid data. The keypad

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CIRCLE 138 ON READER SERVICE CARD

SYSTEM DISK 1

July 5, 1984
Ms. Ileen Rockefeller
ARTIST'S GUILD
2000 Washington Blvd.
New York, NY 10012

Dear Mrs. Rockefeller:

It gives me pleasure to inform you that selling the Guild's paintings in Hawaii and the Bahamas has been a success. The Guild is back on its feet. The spreadsheet figures below, show our sales for the past year.

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HAWAII	650,000	340,000	250,000	160,000
BAHAMAS	325,000	415,800	130,000	36,000
TOTAL	\$975,000	\$755,800	\$380,000	\$196,000

DISTRIBUTION CHANNELS MARKETING ANALYSIS

The reason for this success is revealed in the chart displayed to the right.

I invite you to spend few weeks with the Bahamas and the Hawaii. A friend of mine, the clear water, the blue sky, very, very tempting. We should try it.

Sincerely,
ARTIST'S GUILD
Richard Hardworker
VP of Marketing

ER OF THE WORLD'S LLS IT ALL TOGETHER.



frame or another PC.

"Anytime I have a question, all I have to do is ask. Clout will scan up to forty of these files automatically, cross-reference five simultaneously, and there's my answer. I don't have to know exactly how the data is organized. Or even in which file it's stored."

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SHIPPED MORE
RED AND GREEN ARGYLE
SOCKS THAN PLANNED?"**

"Try typing that into any software package you know. Using exactly those words. Likely all you'll get is a blank stare from the screen.

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CIRCLE 184 ON READER SERVICE CARD

Lemon Computer Company

TASK SCHEDULE BY TASK NUMBER

Aug 10, 84

PAGE 2

Task	Rsp	Dpt	Prj	Sbp	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
					1123	1123	1123	1123	1123	1123	1123	1123	1123	1123	1123	1123
DESCRIPTION					62840	62840	62840	62840	62840	62840	62840	62840	62840	62840	62840	62840
12	A															
Estimate Market Potential					Pc-	Ø	Mh-	Ø					*			
13	A															
Estimate Distribution Costs					Pc-	Ø	Mh-	Ø					*			
14	N															
Estimate Advertising Costs					Pc-	Ø	Mh-	Ø					*			
15	D															
Estimate Manufacturing Costs					Pc-	Ø	Mh-	Ø						*		
16	A															
Price vs. Demand Curve					Pc-	Ø	Mh-	Ø							*	
17	A															
Preliminary Financial Analysis					Pc-	Ø	Mh-	Ø								*
18	L															
Consumer Reactions					Pc-	Ø	Mh-	Ø							*	
19	A															
Preliminary Price Range					Pc-	Ø	Mh-	Ø							*	
20	A															
Check Product Non-Violation of Patents					Pc-	*	Mh-	Ø								

controls are used to move the cursor around quickly. *Task Manager* works equally well on both monochrome and color monitors; the use of highlighting and color is well conceived and helpful.

TASK MANAGER BRINGS THE POWER OF A TRADITIONAL DBM TO THE PROJECT MANAGEMENT REALM.

Task Manager requires no installation unless the default data disk needs to be changed or you use a color monitor. In either case, the program supplies a simple configuration utility, which takes only a few seconds to run. The program is copy protected, and either the distribution disk or a supplied backup disk must be in the A: drive for the program to run. Data can also be stored on a hard disk. The manual provides detailed instructions for this simple, but usually unnecessary installation.

Task Manager doesn't offer a disk tutorial or sample files, but its excellent documentation adequately explains the program's operation. The manual provides tabs for each section even if the section is only a page or two long, making it easy to locate desired information. The IBM-size, nicely typeset documentation also offers a very good table of contents and index.

Task Manager's initial menu shows the available functions. *Task Manager* can produce a great number of reports in various sorted orders. The program allows the user to define any number of standard reports and then either execute them

● *Task Manager's Gantt chart also shows responsibility codes and sub-project indentifications.*

directly or group them in a batch file. Stored standard reports or batch groups can be selected from on-screen directories. Furthermore, the batch files can be automatically executed, which is a real time-saver when you have to make changes to your data or need a group of updated reports.

An Elegant Screen

Data entry uses a simple but elegant screen. The system has fields for the task number, which *Task Manager* assigns sequentially; description (up to an unusually generous 40 characters); a single-letter priority; begin and end date (in MMDDYY format); the responsible individual; his department, project, and sub-project numbers; manpower hours; and percent complete. The latter two items can be disabled at your option. *Task Manager* does not have any provisions for holiday schedules or modified work schedules, and, in some cases, it seems easier to enter a duration for a task rather than the start and end date. The overall entry of the *PC* case study data was straightforward and pleasant. I added department designations to the responsible individuals but didn't enter any of the other field options.

The Right Choices

If you choose the Make A Report option, you are offered a choice of task reports, Gantt charts, and manpower/percent complete reports. Once your choice is made, a list of available sorted orders is displayed and then the database structure of the system becomes obvious because of the tremendous amount of options. *Task Manager* uses index files to point into the main data file to allow its wide variety of reports to be generated quickly. Using the sample data, *Task Manager* takes less than a minute on floppy disks to produce any of the reports.

Moreover, after the sort order is selected, another menu appears allowing you to narrow down the report, such as to a specific department, individual, or date range. If no such choice is made, the program creates a report using the complete task file data.

The resulting report can be directed to either the display screen or a printer. *Task Manager* does not support plotter output, but none is needed because no special graphics characters are used on printed reports. Any printer that can be connected to the PC works well. *Task Manager* prints clear headings that indicate the sort order selected, and the reports are nicely laid out and easy to read. Since the system can produce hundreds of different reports, the capability to predefine specific reports and the automatic batch execution features are useful.

The Gantt Chart

Task Manager uses the same sort and selection provisions in producing its Gantt charts. The program does *not* calculate a

THE PROGRAM IS EASY
TO USE, AND THE
SORTING AND
SELECTION CAPABILITIES
CAN PRODUCE USEFUL
REPORTS THAT OTHER
SYSTEMS CAN'T MATCH.
BUT IT WON'T
CALCULATE THE
CRITICAL PATH.

critical path, so its Gantt charts resemble Milestone charts more than CPM charts. The Gantt chart produces two bars for each task—one shows the beginning and completion dates and the other indicates

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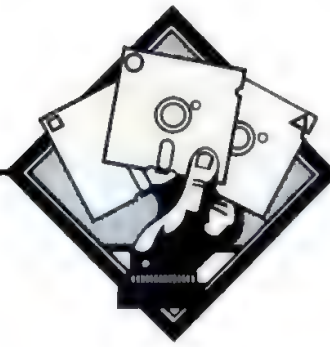
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the percent complete if these data have been entered. In addition, the chart shows the manpower and percent complete figures for each task even if these categories are not being used—a minor annoyance.

The charts are well formatted and easy to read, but the system offers only 4 and 12-month reports. Producing a chart for an extended project like the PC case study requires at least 3 reports annually and probably 12 quarterly reports if more detailed reports are necessary or desired. Of course, these segments can be pasted together, but this process requires more work than if the program could automatically generate multiple-page reports.

The manpower/percent complete report simply displays the appropriate figures. Interestingly, the percent complete is calculated only for nonzero tasks, assuming that tasks with no percent complete are not yet active. This is not an unreasonable assumption, but you can hypothesize scenarios where some activity should have occurred on a task; perhaps it would be better to calculate activity on the tasks in relation to a fixed date of your choice.

Task Manager works beautifully. It is a pleasure to use, and the sorting and selection capabilities can produce very useful reports that other systems can't match. Although there are things the program can't do, such as calculate the critical path, I believe *Task Manager* would be a real enhancement to many project management situations. It is clearly aimed at the executive who must manage projects but who wants a program that is less technical than a full-blown project manager. *Task Manager* meets the needs of such individuals better than many more-complex, but less-flexible, programs. It is reasonably priced, well documented, and easy to use.—Glenn A. Hart

GANTT-IT: A HYBRID PACKAGE



Gantt-It, Schedule-It, Under-Control

A+ Software, Inc.
16 Academy St.
Skaneateles, NY 13152
(315) 658-6918

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Requires: 192K RAM, two disk drives.

CIRCLE 709 ON READER SERVICE CARD

G*antt-It*, by A+ Software, Inc., is one segment of a well-conceived but inconsistently documented software package that includes a file management system, *Under-Control*; a project scheduler, *Schedule-It*; and the *Gantt-It* project-tracking system.

The core of the package is *Under-Control*, a file manager/report writer designed to compete against programs such as *Perfect Filer-PFS File*. *Under-Control* enables you to build or modify record tables using a menu-driven system. In addition, it supports the usual file manager features, including capability to add, delete, and edit records, multilevel sorts, and browse routines.

Each *Under-Control* data file holds up to 32,000 records (disk space permitting). It allows 9,999 fields per record and 65 characters per field. Maximum record length is 9,999 characters. In typical project management applications, these capabilities translate to 650 tasks per project on a 160K disk and about 1,300 tasks per project on a 320K disk. This file manager concept, gives you a wide latitude for designing your own fields for project and task description.

Gantt-It, an *Under-Control* option, uses *Under-Control* to maintain task-related files. *Gantt-It* provides budget and vari-

● This is a network report detailing early start, late start, early finish, and late finish dates.

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HARDWARE

AST Research (For IBM-PC or XT)

All AST Boards come with SuperDrive, SuperSpool, and one year warranty
SixPakPlus 64k upgradeable to 384k, with clock/calendar, serial and parallel ports (game port optional)..... 259
MegaPlus II 64k upgradeable to 256k (or more with MegaPak) with clock/calendar and serial port (parallel, game, or second serial port optional)..... 259
MegaPak 128k (not upgradeable)..... call
MegaPak 256k..... call
I/O Plus II with clock/calendar and serial port (parallel, game, or second serial port optional)..... 129.
Parallel, Game, or second Serial Port for any AST board (specify board)..... 35.
Connectall connector bracket (PC only) 19
AST-5251..... 559
ASI-3780..... 629
MonographPlus with clock/calendar, serial & parallel ports..... 429.

Amdak

Video 300G monitor (green)..... 139.

Video 300A monitor (amber)..... 149

Video 310A monitor (amber)..... 179.

Compucable

Plastic Keyboard & Drive Cover Set... 17

IBM Mono Screen Enhancement..... 17

IPC CONNECTION®

reductions.

Printer to IBM Cable (specify printer)... \$27
Smartmodem to IBM Cable 25.

Curtis

STANDS

PC Pedestal (for IBM Mono or Color)... 39.
PGS or Quadchrome Adapter for above... 9
Low Profile Tilt and Swivel Pedestal 39
System Stand 21

CABLES

Extension Cables for IBM Mono Display 39
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SURGE SUPPRESSORS - NEW

Diamond (similar to EPD Lemon) 39
Emerald (similar to EPD Lime) 49.
Sapphire (similar to EPD Peach) 59
Ruby (similar to EPD Orange) 69

Epson

RX-80 with GRAFTRAX-Plus call
RX-80 F/T with GRAFTRAX-Plus call
FX-80 with GRAFTRAX-Plus call
RX-100 with GRAFTRAX-Plus call
FX-100 with GRAFTRAX-Plus call
LQ-1500 (letter quality dot matrix) call
Printer to IBM Cable (specify printer) ... 32

FTG Data

Light Pen (Push Tip) 195
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Hayes

Smartmodem 300 199
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Smartmodem 1200B (w/Smartcom II) 397
Smartcom II 99
Compucable's Smartmodem-to-IBM
Cable 25

Hercules Computer

Hercules Graphics Card (parallel port) 319
Hercules Color Card (parallel port) ... 179
Graph-X Software 42.

key tronic

Typewriter style keyboard (KB 5150) call
Deluxe keyboard (KB 5151) call

Koala

Koala Touch Tablet with software
(connects to game port) 89
Speed Key System see special

Kraft

Joystick 39

Maynard Electronics

Floppy Drive Controller 135.
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& ROM for PC mother board 879.
Internal Hard Disk (10 Meg) WS-2 Controller
& ROM for PC Mother Board ... 1079

Mouse Systems

PC Mouse (w/software & desk pad) ... 139
Mouse Paint (software) 75

NEC

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Pinwriter P3(IBM) 132 col 897
Spinwriter 2050 (3550's little brother) ... 699
Spinwriter 3550 (IBM-PC compatible) 1397
Spinwriter 8550 (IBM-PC compatible) 1789

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with clock calendar, serial and
parallel ports \$229
PCnet Daughter Board (piggybacks to
Blossom) with version 2.4 networking
software call
PCnet Blossom 64k Blossom Board with
the Daughter Board installed ... call
Diskless Boot Rom, Cluster Kit, etc. call

Plantronics/Frederick

COLORPLUS (with Color Magic) call

Princeton Graphics

HX-12 RGB monitor (690 x 240) call
SR-12 RGB monitor (690 x 480) call
Scan Doubler Board (for SR-12) call
MAX-12 Amber monochrome monitor . call

Quadram

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MP 64 (64k) upgradeable to 512k 179.
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DOS/Basic 2 0-2.1 Wordstar
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Multiplan (Microsoft) dBase III
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Volkswriter Deluxe each 12

STB

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TG

Joystick 45

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Tandon

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TEAC

FD-55B (5 1/4") half-height drive (DS,DD) 159
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Datalife Disks DS/DD plastic box of 10 33.
Disk Drive Analyzer 22
Flip Sort (holds 75 disks) 19.

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64k Memory Upgrade Set for IBM-PC
or XT system board 45
64k Memory Upgrade Set for any memory
board specify make of board... 45.
Install memory upgrades & run diagnostics
at time of board purchase only 10

INFORMATION SERVICES

Compuserve

Compuserve Information Service
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connect time, monthly publications) 25

Source Telecomputing

The Source (subscription & manual) ... 29

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PC Pub.

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PC CONNECTION

Page: 1

ance reporting, Gantt chart display for projects up to 2 years in length, cost allocation, collective time and other costs, sequential transaction files, and multiple-disk-file report input. A report writer integrated in *Under-Control* lets you design your own reports if you don't like *Gantt-It*'s default options.

Schedule-It, another *Under-Control* option, adds CRT or printer output of critical path, slack time, and milestones. It features a 2-year, workday calendar and time units in hours, days, or months.

Too Good to Be True

When I first looked at this package for *PC Magazine*, A+ Software's concept of combining a general-purpose file manage-

SCHEDULE-IT AND GANTT-IT RUN ON DUAL FLOPPIES OR ON A HARD DISK. BUT TO RUN THE ON-LINE DEMONSTRATION PROGRAMS ON HARD DISK, YOU HAVE TO EDIT UNDOCUMENTED BATCH PROGRAMS.

ment system with elements of a scheduler seemed like one heck of a good idea. However, in implementation, the package leaves much to be desired. For instance, the documentation for the file management system, *Under-Control*, adequately covers the subject. But, the documentation for the scheduling elements—*Schedule-It* and *Gantt-It*—is poor, mainly because it depends heavily upon the *Under-Control* documentation. Consequently, even if you just want to schedule

projects you still have to struggle with documentation for *Under-Control*, which you'll never use directly.

Schedule-It and *Gantt-It* run either on dual floppies or on a hard disk. However, to make the on-line demonstration programs work on hard disk, you have to edit several undocumented batch programs. This is definitely a problem because most users who will be using these packages are probably not programmers. And, presumably, if you need the on-line tutorial, you will balk at the necessity to rewrite BAT programs, which, in theory at least, are supposed to make your life easier. In any event, installation of the programs is relatively quick only because all you have to do is copy the programs to working disks or a hard disk—that is, if you can live without the demos on hard disk.

The package provides helpful sample screens and reports, but the combination of screens and documentation failed to give me a comprehensive understanding of the package. Ideally, software documentation should be written using a whole-part-whole outline. The A+ Software documentation seems to jump into the middle of the system without giving the user a complete overview of what's going on (or what should be going on).

The Bad News

The case study generated mixed results. The bad news is that PC's 100-activity test case could not be loaded into the *Schedule-It* system—despite three tries—without running afoul of an untrapped fatal error. Upon reaching activity 97, the system simply hangs up, and you have to either shut down the system or lose everything. I attempted to contact A+ Software, but I was intercepted by a phone-answering service representative

who had no idea how the compiled BASIC program works. My inability to carry out the full test was especially disappointing because the activity input process itself seemed very well thought-out.

In the activity-input mode, the screen is split with eight previously entered tasks shown on top, a form for the task being added or edited in the middle, and a help-line at the bottom.

Schedule-It makes excellent use of function keys for processing and moving about an interactive schedule. For instance, type-head can be toggled, and help can be requested at any time by pressing the question mark (?) key.

The Good News

Although I couldn't complete the full assigned task, the part I did complete makes me believe that a fully debugged *Schedule-It* could provide a flexible job analysis system with the added features of a general-purpose file management system. Moreover, the file management system and its internal report writer claim to offer an unlimited variety of reports and specially modified scheduling capabilities. I can't offer an opinion because I didn't test them.

A+ Software promises new documentation and fully debugged code in a pending release. Although the price seems attractive—*Under-Control* lists for \$80, while adding *Gantt-It* brings the cost to \$155, and adding *Schedule-It* to the *Under-Control/Gantt-It* package raises the total to \$180—I have to recommend you forget about this package until the final debugged version is released. Once that happens, I recommend investing in the \$20 demo to make sure the package will meet your needs.—Dick Aarons

(Text continues after chart)

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NAME	HARDWARE REQUIREMENTS			DOCUMENTATION	
	MEMORY	NUMBER OF DISK DRIVES REQUIRED	FIXED DISK REQUIRED	HAS TUTORIAL	GIVES SAMPLE DATA
LEVEL II					
GANTT-IT	192K	2	NO	YES	YES
PAC MICRO	128K	1	NO	YES	YES
PLAN/TRAX	256K	1	NO	NO	YES
PMS-II/RMS-II	128K	2	NO	NO	YES
PRIMAVERA PROJECT PLANNER	512K	1	YES	YES	YES
THE PROJECT MANAGER	64K	1	NO	NO	YES
PROJECT MANAGER WORKBENCH	320K	1 (2 recommended)	NO	YES	YES
QWIKNET	384K	2	NO	NO	NO
TASK MANAGER	128K	1	NO	NO	NO
LEVEL III					
ESTIPLAN	128K	2	NO	NO	YES
PLANTRAC	128K	2	NO	YES	YES

SYSTEM CAPACITIES

NUMBER OF RELATED PROJECTS	TASKS PER PROJECT	LEVELS OF HIERARCHY	RESOURCE CATEGORIES	SCHEDULING UNITS	MAXIMUM \$ AMOUNT	TASKS DISPLAYED SIMULTANEOUSLY
1	650 on 160K disk; 1,300 on 320K disk	1	1 per task	Hours and days	Variable	18
1	400	1	100	Hours and days	\$999,999,999.99	20
1	300	1	10	Days	\$999,999,999	19
Limited by disk capacity	2,750	Subnetworks limited by disk capacity	96	Days	\$99,999,999	1
Limited by disk capacity	10,000 (total for all projects)	20	96 (6 per task)	Days	\$20,000,000 per activity	1
1	399	1	None	Days	\$99,999 per task	17
Limited by disk capacity	Limited by disk capacity	Limited by disk capacity	9 per task	Hours and days	\$9,999,999	12
1	250	1	100 per project, 12 per task	Days and weeks	\$21,460,000	15
1	999	2:subproject and task	1 person per task	Days	No maximum	5
Limited by disk capacity	Limited by disk capacity	3:phase, task, and subtask	26 per project, 8 per activity	Hours	\$9,999,999.99	18 tasks or 9 subtasks
25	62,500 (2,500 per subproject)	Limited by disk capacity	200	Days and weeks	\$999 million	15




NAME	FEATURES				
	COPY PROTECTED	MIXED PLANNING UNITS	CHANGES PLANNING UNITS	ON-LINE HELP	CRITICAL PATH HIGHLIGHTED
LEVEL II					
GANTT-IT	NO	NO	NO	Yes, context-sensitive	Yes, by arrow symbol
PAC MICRO	NO	NO	NO	NO	Yes, by color or high intensity
PLAN/TRAX	YES	NO	NO	NO	Yes, by asterisks
PMS-II/RMS-II	NO	NO	NO	NO	Yes, by special characters (on printout)
PRIMAVERA PROJECT PLANNER	NO	NO	NO	Yes, context-sensitive	Yes, by red (in Primavision only)
THE PROJECT MANAGER	NO	NO	NO	YES	Yes, by color, solid block, or asterisk
PROJECT MANAGER WORKBENCH	YES	YES	Display can change from weeks to months	Only in Expert mode	Yes, by highlighting
QWIKNET	YES	YES	Only on a task-by-task basis	Yes, context-sensitive and window overlay	NO
TASK MANAGER	YES	NO	NO	NO	NO
LEVEL III					
ESTIPLAN	NO	NO	NO	NO	Yes, in red
PLANTRAC	NO	NO	YES	NO	Yes, by special characters

INPUTS

CHARACTERS ALLOWED IN TASK DESCRIPTION	ALLOWS 3 TASK ESTIMATES	DEFINES TASK DEPENDENCY		INSERTS TASKS	READJUSTS DEPEND- ENCIES	MULTIPLE BILLING RATES
		AS % OF TASKS COMPLETED	AS # OF PRECEDING TASKS			
10	NO	In time units	3	YES	NO	YES
22	NO	NO	3	YES	YES	NO
30	NO	NO	Unlimited	YES	NO	NO
60	YES	NO	1	YES	YES	NO
48	NO	In time units	Unlimited	YES	YES	YES
20	NO	NO	NO	YES	YES	NO
27	NO	NO	Unlimited	YES	YES	NO
48	NO	NO	Unlimited	YES	NO	NO
40	NO	NO	NO	YES	NO	NO
25	YES	NO	4	YES	YES	NO
50	NO	In time units	2,499	YES	NO	YES

"Excuse Me,



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An advanced, easy-to-use data management system for the IBM® PC and compatibles.

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"The menu, Please?"

Menus list all your options and tell you exactly which keys to press for every *Please* feature.

That's to be expected. As the telecomputing leader, Hayes built its reputation on quality design, relia-

bility and customer support. Now these same standards have been applied to a new data management system that is going to instantly change the way you do business!

Say you're looking for an efficient way to maintain sales data. *Please* leads you every step of the way in creating a sales database that might include names, addresses, dates and figures. These categories are called "fields" in database lingo, and they're the very heart of your database structure.

Want last month's total in a particular region? Press a few keys and it's yours! A few more keystrokes and you'll know who's moving product, and what's your biggest seller.

Please will supply you with labels for a mailing to selected customers. It can send customer information to your word processor for a promotional letter. And it can receive data from

your spreadsheet program. *Please* will even look up a name and company for you, your Hayes Smartmodem* will dial the phone number, and you're ready to talk!

Taking this same sales database, you might also want to define special

fields for a custom Output Plan.

With a defined field for "COMMISSIONS DUE,"

Please can automat-

ically compute each salesman's commissions, and print them out in a report of your own design. All this and more, just for saying "Please."

And if you ever change your mind and want to change the structure of your database, please feel free. Step-by-step instructions show you how.

You have this same flexibility with any database you and *Please* design. You can store up to 16 million records† and 200 custom Output Plans for each database! More than you're likely ever to require. But isn't it nice

"Make it snappy, Please!"

Need a report fast? You and *Please* can put together a Quick List in a matter of seconds.

Please.



"Put it here, Please."

Design a special screen format to position data in a particular place.

Just in case you ever need it?

Now you might think that a data management system that does all this must be difficult to use. Right? Rest assured. *Please* works hard so you don't have to. An easy-to-follow sample disk shows you everything you need to know to create your first database. Three *Please* menus show you which keys to press to access every feature. And whenever you need it, *Please* provides on-screen HELP messages, tailored to a specific task. So you needn't waste time reading through a list of unrelated instructions on your screen. Or stop what you're doing to consult a manual. In no time at all, and with no assistance at all, you'll be a *Please* database pro!

knowing all that storage power is there?

"Merge these, Please."

Combine data from one database into another, without changing your original.

Everything about *Please* is designed to save you time and effort. So what could make data management even easier? *Please Application Templates*, that's what!

To help you get up-and-running immediately, we've developed a series of practical, pre-designed templates. You'll appreciate their well-thought-out structure, and "fill-in-the-blank" ease. Choose several for business and personal use.

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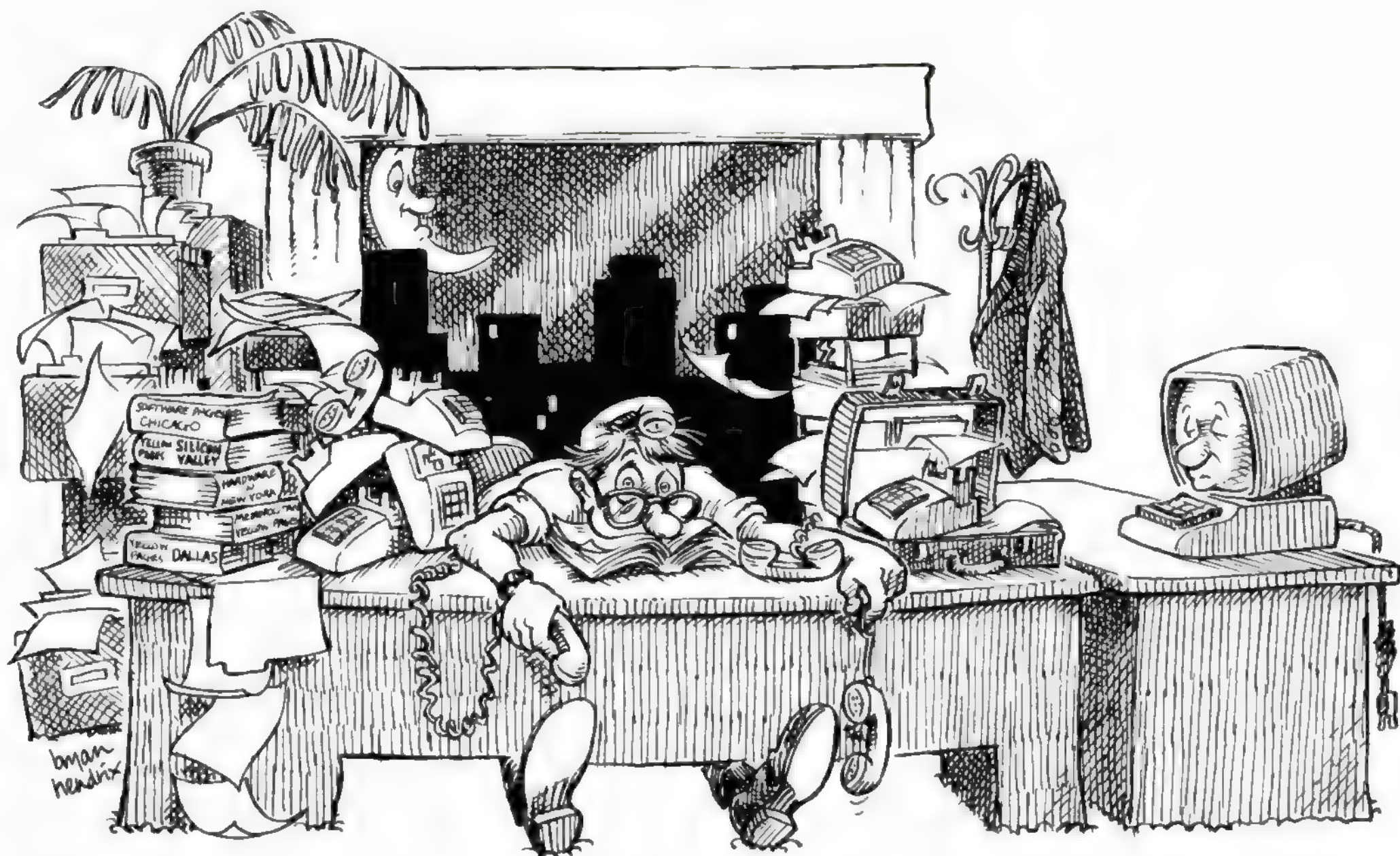
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NAME	OUTPUTS				
	PROJECT PLAN/TASK LIST	NETWORK ANALYSIS	GANTT CHART	PERT CHART	RESOURCE LIST
LEVEL II					
GANTT-IT	Yes, on screen and printer	NO	Yes, on screen and printer	NO	NO
PAC MICRO	Yes, on screen and printer	Yes, on screen and printer	Yes, on screen and printer	Yes, on screen and printer	Yes, on screen and printer
PLAN/TRAX	Yes, on screen and printer	Yes, on screen and printer	Yes, on screen and printer	NO	Yes, on screen and printer
PMS-II/RMS-II	Yes, on screen and printer	Yes, on printer	Yes, on printer	Yes, on printer	Yes, on printer
PRIMAVERA PROJECT PLANNER	Yes, on printer	Yes, on printer	Yes, on printer	Yes, but only with <i>Primavision</i>	Yes, on printer
THE PROJECT MANAGER	Yes, on screen and printer	Yes, on screen and printer	Yes, on screen and printer	NO	NO
PROJECT MANAGER WORKBENCH	Yes, on screen and printer	Yes, on screen and printer	Yes, on screen and printer	Yes, on screen	Yes, on screen and printer
QWIKNET	Yes, on screen and printer	Yes, on screen and printer	Yes, on screen and printer	Yes, on screen	Yes, on screen
TASK MANAGER	Yes, on screen and printer	NO	Yes, on screen, and printer	NO	NO
LEVEL III					
ESTIPLAN	Yes, on screen and printer	No, except through mainframe interface	Yes, on screen and printer	No, except through mainframe interface	Yes, on screen
PLANTRAC	Yes, on screen and printer	Yes, on screen and printer	Yes, on screen, printer, and plotter	Yes, on screen, printer, and plotter	Yes, on screen and printer

						VENDOR SUPPORT
FUNDING SCHEDULE	MANPOWER LOADING	HOLIDAY CALENDAR	SUB- CONTRACTS	UPDATED PROJECT PLAN	UPDATED NETWORK ANALYSIS	HOT-LINE TECHNICAL SUPPORT
NO	NO	Yes, on printer	NO	Yes, on screen and printer	NO	NO
Yes, on screen	Yes, on screen	Yes, on screen and printer	Yes, on screen and printer	Yes, on screen and printer	Yes, on screen and printer	YES
Yes, on screen and printer	Yes, on screen and printer	NO	NO	Yes, on screen and printer	Yes, on screen and printer	YES
Yes, on printer	Yes, on printer	Yes, on printer	Yes, on printer	Yes, on printer	Yes, on printer	YES
Yes, on printer	Yes, on printer	Yes, on screen and printer	Yes, on printer	Yes, on printer	Yes, on printer	YES
NO	NO	Yes, on screen	NO	Yes, on screen and printer	Yes, on screen and printer	YES
NO	Yes, on screen and printer	Yes, on screen	Yes, on printer	Yes, on screen and printer	Yes, on screen and printer	YES
Yes, on screen	NO	Yes, on screen	NO	Yes, on screen and printer	Yes, on screen and printer	YES
NO	NO	NO	Yes, on screen and printer	Yes, on screen and printer	NO	YES
Yes, on screen	No, except through mainframe interface	No, except through mainframe interface	No, except through mainframe interface	No, except through mainframe interface	No, except through mainframe interface	YES
Yes, on screen and printer	Yes, on screen, printer, and plotter	Yes, on screen and printer	Yes, on screen and printer	Yes, on screen and printer	Yes, on screen and printer	YES



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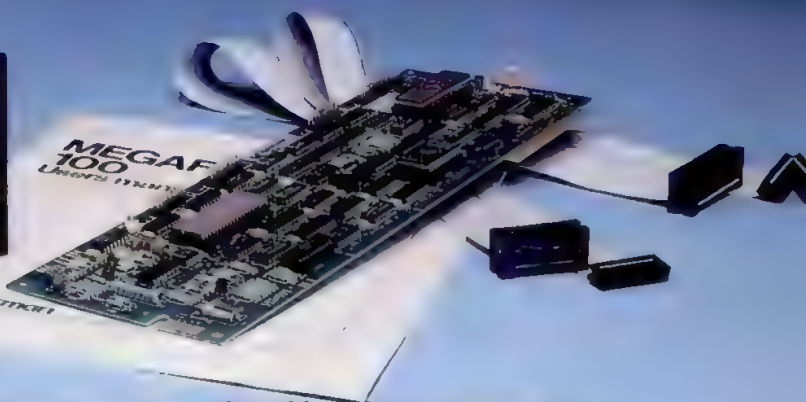


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LEVEL II					
GANTT-IT	Yes, with Gantt-It, Schedule-It, and Under-Control	Yes, with DIF	\$285	YES	YES
PAC MICRO	Yes, with Estiplan, ISDM, PAC II, PAC III, and PC/70	NO	\$990	YES	YES
PLAN/TRAX	NO	NO	\$595	Yes, to dealers	From vendor only
PMS-II/RMS-II	Yes, with Material Mgmt. System and Batch Processing System	NO	PMS-\$1,295 RMS-\$995	YES	YES
PRIMAVERA PROJECT PLANNER	Yes, with Primavision	NO	\$2,500. Primavision: \$1,500	YES	YES
THE PROJECT MANAGER	NO	NO	\$495	YES	From vendor only
PROJECT MANAGER WORKBENCH	NO	NO	\$1,150	YES	YES
QWIKNET	NO	NO	\$795 with mouse	NO	YES
TASK MANAGER	NO	NO	\$395	YES	From vendor only
LEVEL III					
ESTIPLAN	Yes, with PAC MICRO, PAC II, PAC III, PC/70	NO	\$4,750 for two copies	YES	YES
PLANTRAC	Yes, with Plantrac SC, Bridge, CS, and TS	NO	\$3,000 first year; \$1,000 a year thereafter	YES	YES

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Phone 503-626-6877

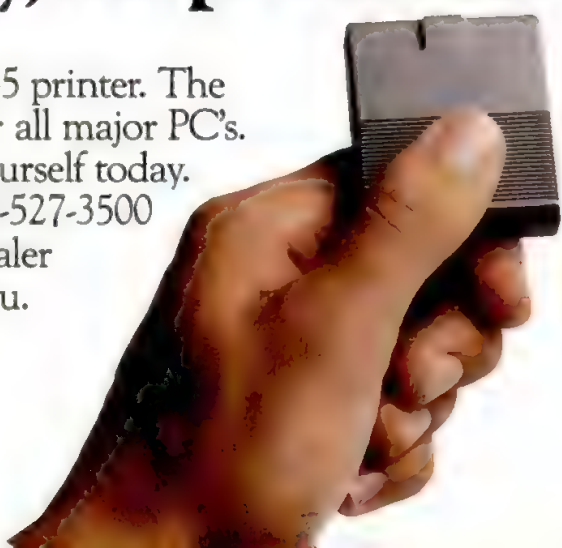
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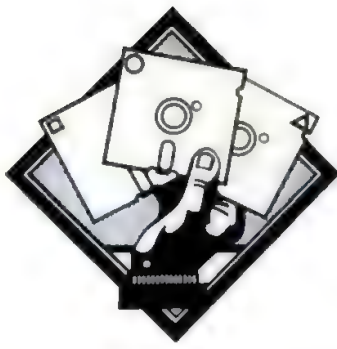
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PRIMAVERA: MAINFRAME POWER WITH MICRO EASE



Primavera Project Planner, Version 2.31

Primavera Systems, Inc.
29 Bala Ave. #224
Bala Cynwyd, PA 19004
(215) 667-8600

List Price: \$2,500

Requires: 512K RAM, hard disk,
DOS 2.x

CIRCLE 708 ON READER SERVICE CARD

The hazards of bringing mainframe software to microcomputers are many, but the rewards are great. Mainframe programs adapted for microcomputers generally exchange usability and functionality for power. Primavera Systems, Inc., has managed to have it both ways: it has brought mainframe power to microcomputers with a sophisticated project management tool that is easy and convenient to use.

Primavera Project Planner is billed as a "professional-grade management and control system," and it lives up to its billing. It can handle up to 10,000 activities in a single project. Experienced, mainframe-oriented project managers will find *Primavera* a real workhorse, and managers who have outgrown simpler project planning packages will take to it with ease.

Getting Started

Primavera comes on four disks and requires a hard disk and 512K RAM. The reference manual clearly explains the straightforward installation procedure.

The documentation is divided into a tutorial that exposes you to most of the program's features, a reference section of technical information, and a "primer" of

project management techniques that both experienced project managers and novices will appreciate.

Primavera Systems, Inc., offers excellent hot-line support. When we experienced difficulties with a disk-read error during installation, we telephoned the company and received new disks the next morning. With a system this large and powerful, technical support is critical, and Primavera Systems seems committed to providing that support.

The Case Study

Primavera is menu-driven, allowing you to enter complex activity, resource, and cost information. Projects may be calculated using the activity-on-node (precedence) method, or the activity-on-arrow method. The package can output reports to a printer or a plotter but not on-screen. *Primavera* is intended to process large projects and does not include convenient facilities for "what if" analyses.

Primavera does allow convenient entry of a work calendar, including number of days worked per week and holidays. Once you establish a calendar, you can enter activities on the Activity Data screen. You enter the activity description along with start dates and durations. On the bottom of the screen is a menu of several commands, including EDIT, AUTOSORT, HELP, and PRINT. You can readily obtain information on costs, resources, dates, and constraints by using the WINDOW command, which displays information in the screen's lower window. You may also add and delete tasks; the rest of the project is automatically adjusted.

Primavera is a powerful program, yet it's not difficult to run. The program's screens are thoughtfully designed. All user entries appear in boldface, while screen

fields appear in normal characters.

One important criterion for judging the power and usefulness of project manage-

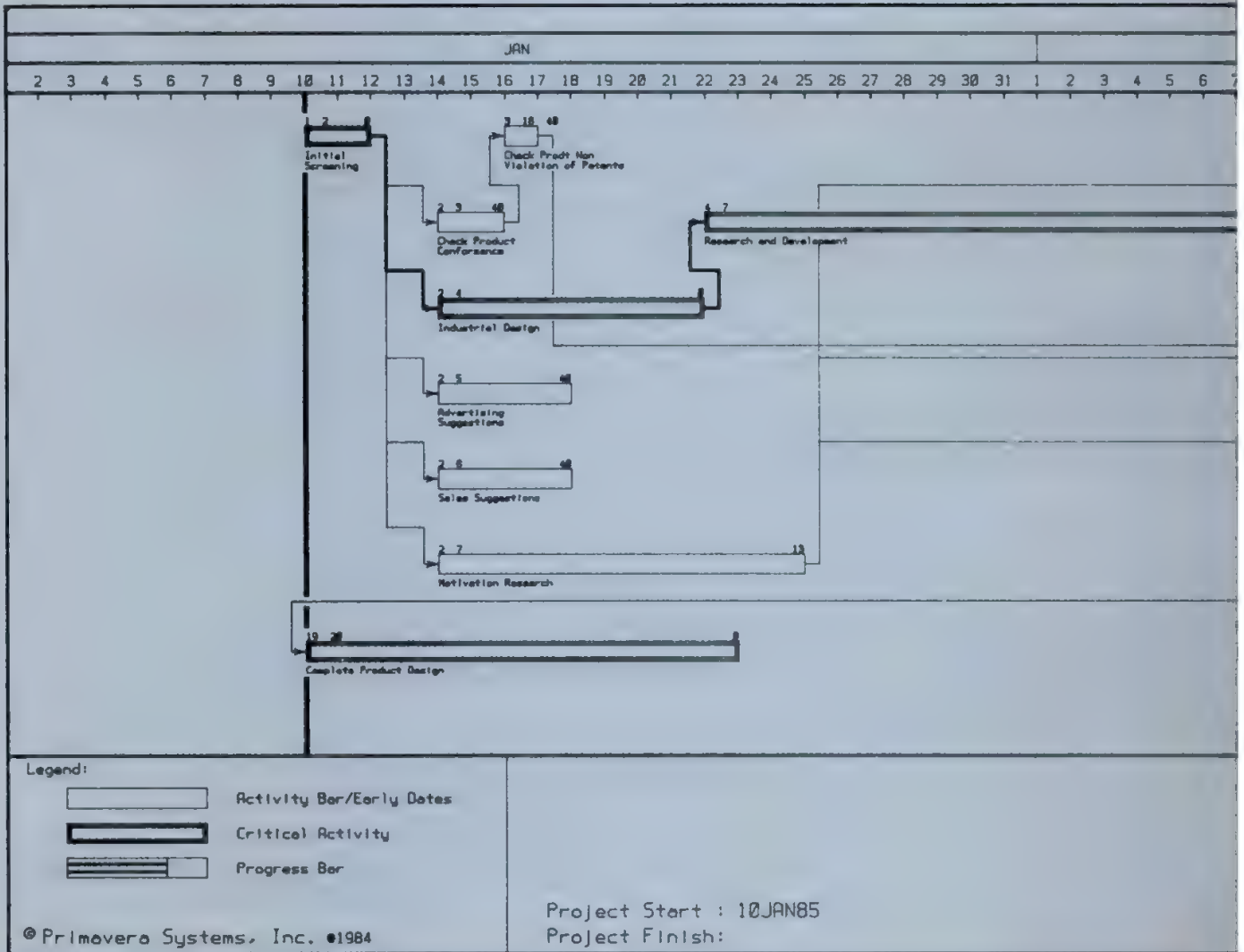
● The network diagram below was drawn on a Houston Instruments DMP 51 series plotter.

ment software is its ability to produce reports. *Primavera* excels in this area.

Primavera's reports include a network diagram, a Gantt chart, activity lists, resource reports, and cost reports. It can produce several kinds of reports in each of these categories. You can sort and sum-

marize information using a variety of different fields, such as early start, slack time, activity code, successor, or cost code, depending on the type of report you want.

For example, you can produce a resource report that details budgeted



resources, resources expended to date, and resources required to complete the tasks. *Primavera* also has an algorithm for "leveling" up to six resources, that is, it allows for the natural "winding down" of the use of a particular resource near the project's end. Leveling does not produce

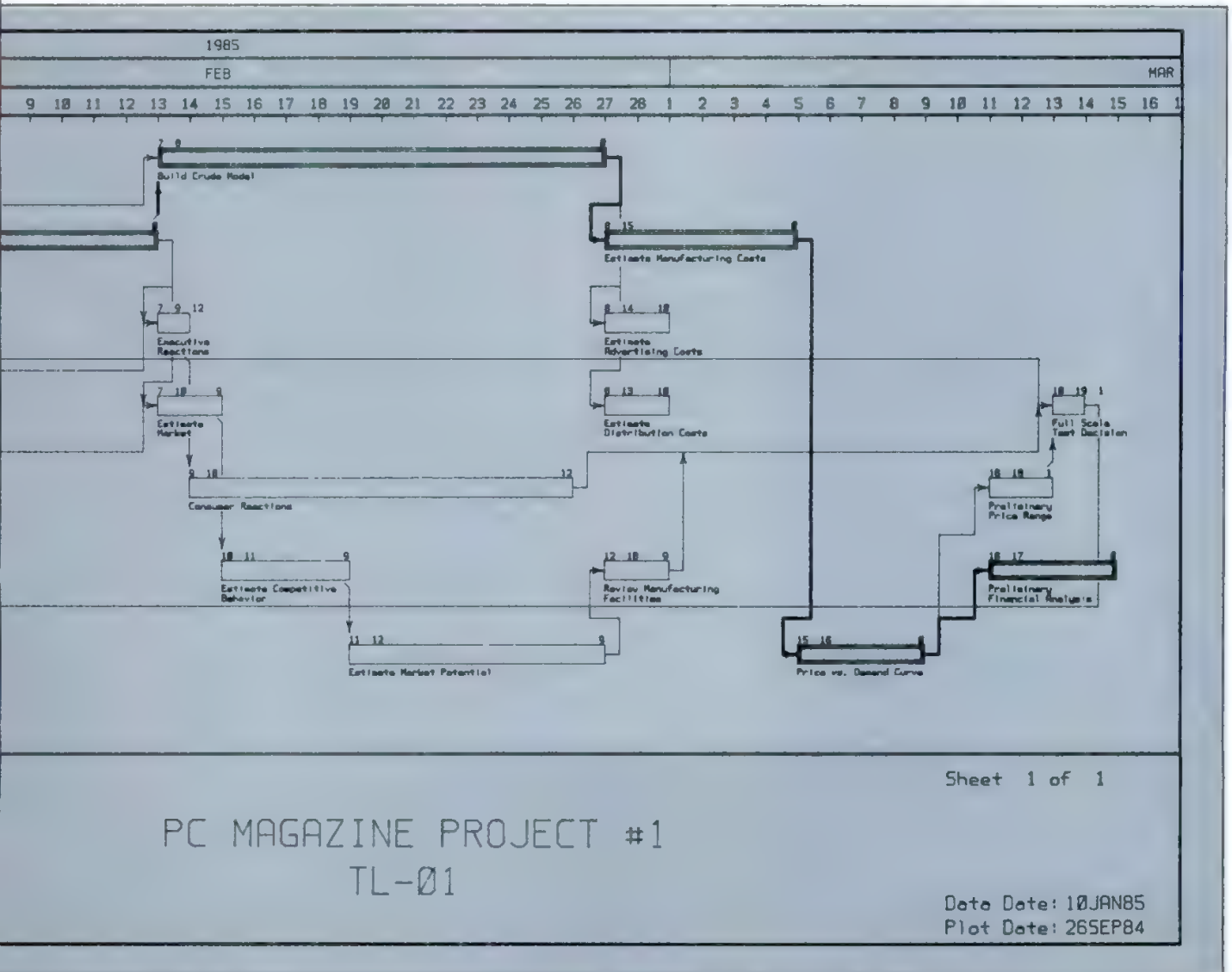
the optimum schedule, but it gives management a useful tool for analyzing possible resource allocation problems.

Government Approval

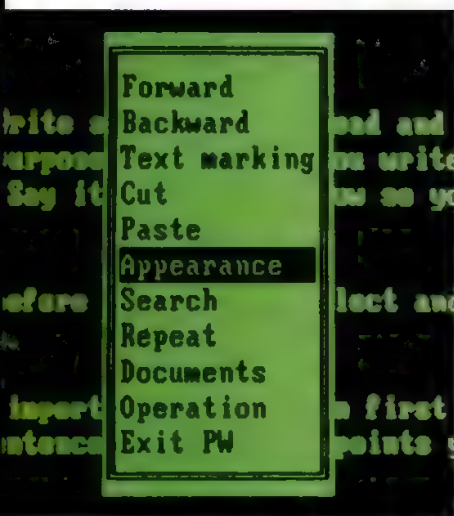
Primavera Systems claims its program's reports meet the requirements of

the Department of Defense and other government agencies. The reports will undoubtedly meet most internal management requirements.

Primavera can print any of its reports to a disk file. By producing an ASCII file, *Primavera*'s power is available to spread-

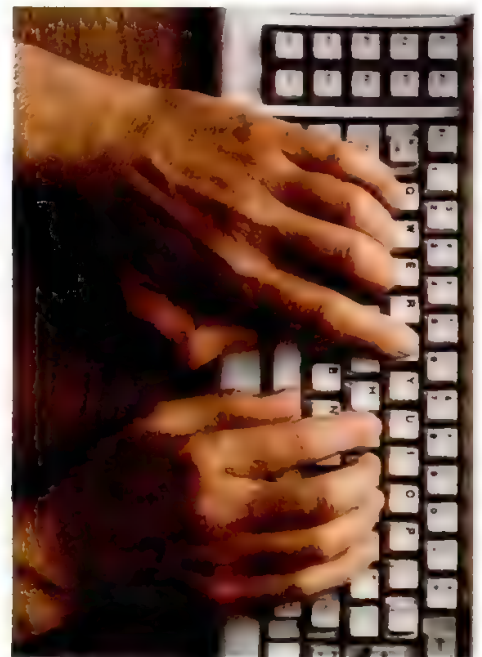


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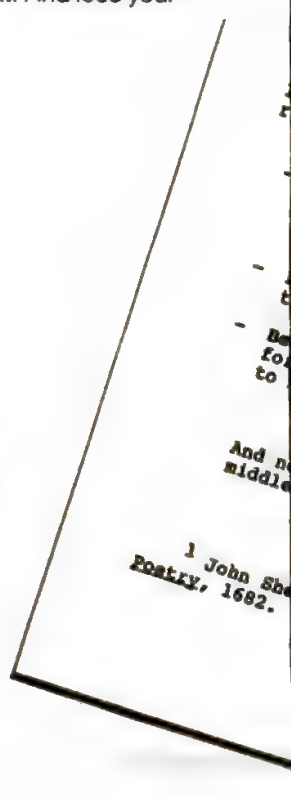
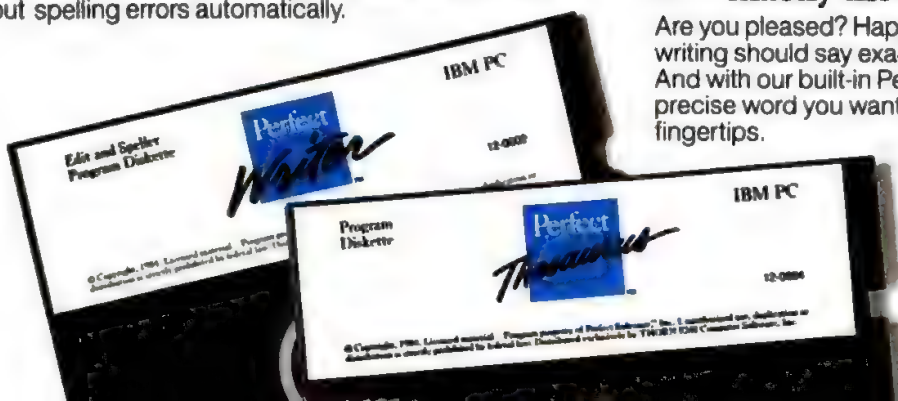
Perfect Writer makes it extra easy to make changes for the better. One key at a time is all it takes to move text. Search and replace. Add or delete words, sentences, even entire paragraphs.

4 A 50,000 word dictionary that helps you correct spelling mistakes.

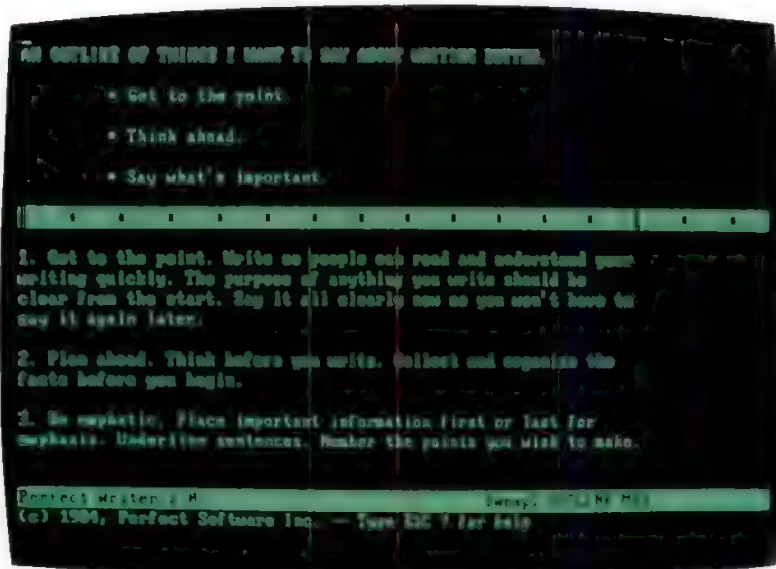
Nothing destroys good writing faster than bad spelling. So Perfect Speller™ checks your document and points out spelling errors automatically.

5 A Perfect Thesaurus™ to help you choose exactly the right word.

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program doesn't give you writing, it's not Perfect.™



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If you want page numbers, Perfect Writer can handle it—automatically.

Perfect Writer automatically numbers, positions and prints out footnotes. Whew.

...ing? Consider the following:
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Get to the point. Write so people can read and understand your writing quickly. The purpose of anything you write should be clear from the start. Say it all clearly now so you won't have to say it again later.
Plan ahead. Think before you write. Collect and organize facts before you begin.
Be emphatic. Place important information first or last for emphasis. Underline sentences. Number the points you wish to make.
Put main thoughts in indented paragraphs.
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field, Duke of Buckingham and Normanby, Essay on

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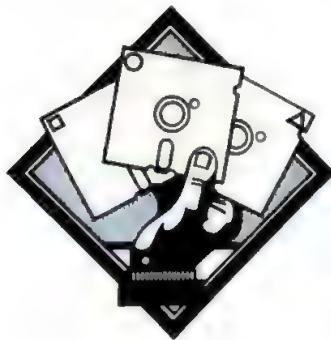
THORN EMI Computer Software, Inc.

THORN EMI Computer Software, Inc., 3187 C Airway Avenue, Costa Mesa, CA 92626

CIRCLE 488 ON READER SERVICE CARD

Perfect Software from THORN EMI Computer Software, Inc. is available for the IBM® PC, IBM PCjr, Apple IIe, and Apple IIc computers as well as for selected computers that use MS™-DOS, CP/M® 80 and CP/M® 86. Because of differences in computer architecture some features may not be available on every version.

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sheet and database programs such as *dBASE II*, and *1-2-3*.

Primavera, priced at \$2,500, seems well worth the cost for those who need a sophisticated project management tool. It is not a simple planning package, but,

rather, a powerful tracking tool that will help you keep abreast of a project's progress and simultaneously stay within your budget.

Primavera combines the flexibility and comprehensiveness of a mainframe pack-

age with the ease of use and conveniently designed screens normally associated with programs originally developed for microcomputers. *Primavera* has a comfortable lead over other packages in its league.

—Diane Burns and S. Venit

LEVEL III

ESTIPLAN: STREAMLINING DEVELOPMENT SOFTWARE



Estiplan

AGS Management Systems, Inc.
880 First Avenue
King of Prussia, PA 19406
(215) 265-1550

List Price: \$4,750 first two copies and license; \$250 each additional copy to same licensee.

Requires: 256K RAM, two disk drives.

CIRCLE 722 ON READER SERVICE CARD

If your office has IBM PCs hooked into a mainframe network, and you are involved either in producing large-scale software systems or in data processing, then *Estiplan* may be the project management package for you. *Estiplan* was developed as a PC-compatible add-on to AGS Management Systems's mainframe project control software (*PAC II*, *PAC III*, and *PC/70*) and systems development methodologies (*SDM/70* and *SDM/Structured*). These systems were designed to help project managers control large software systems projects by using predefined phase/task breakdowns following standard systems development method.

Estiplan was developed so that, rather than tying up a mainframe terminal, a project manager could use a PC to input data. Since *Estiplan* deals in the same data structures as the large AGS systems, it can

be used to get quick estimates of a project's time and cost. The information entered through *Estiplan* can then be transferred to the mainframe for more detailed project scheduling and control, through the use of a larger system such as *PAC II* or *III*. Although *Estiplan* was not designed to stand alone, a feature on the newest version reportedly allows it to be used as one.

Getting Started

Realistically, getting started with *Estiplan* requires having one of AGS Management Systems's other project planning or control systems on the mainframe. *Estiplan* itself comes on two diskettes: a copy-protected program diskette that runs in drive A:, and a work breakdown structure (WBS) file diskette that runs in drive B: or can be copied onto your hard disk.

(*Estiplan* refer to a project as a "work breakdown structure," which is simply a defined set of tasks usually accomplished in particular discrete steps and divided into a number of project phases.)

I used a limited demo version of the two *Estiplan* diskettes, which I installed by copying the programs onto a hard disk, then inserting the files disk in drive A: and typing RUN ESTIPLAN. The main menu offers six options: Create or Modify a WBS; Detail Estimating; Macro Estimating; Create Project Control Input; Mainte-

nance and Hardcopy Reports; Return to the Operating System.

Project Demo-lition

Because *Estiplan* is specifically intended to handle software systems development projects, the case study materials used to evaluate other project planning packages were not appropriate here. However, the demo disk provided by the manufacturer included a sample project to facilitate a quick review of how the system works. Unfortunately, all that the demo system allows you to do is to view estimates and print reports; therefore, I could not test Option 1, "Create or Modify a WBS," on the main menu.

Designed to work with AGS Management Systems's mainframe project control software, *Estiplan* offers a quick way of estimating time and costs for tasks in a project. Information entered through *Estiplan* is organized according to particular format and passed to the mainframe system for detailed scheduling, tracking, and status reporting.

If you are planning a typical EDP project, you can let *Estiplan* define nine common phases: abbreviated specifications, system requirements definition, system design alternatives, system external specifications, system internal specifications, programming, testing, conversion, and implementation. (Most EDP depart-

ment programmers and analysts are already familiar with this terminology, which is also used in AGS's SDM/70 and SDM/Structured methodologies. If you are not familiar with EDP projects, then you would probably benefit by taking the courses and seminars offered by AGS. These include training in project management techniques as well as in the specific use of their products.)

The *Estiplan* manual, following the form of "traditional" mainframe docu-

● A work breakdown structure for a phase, detailing task dependencies and guidelines for estimating time requirements.

E S T I P L A N						
Option 5 - Print a WBS			WBS: DEMO - DEMO LIFE CYCLE			
			PHASE: 1SRD - REQUIREMENTS DEFINITION			
Task	Sub-	Task	DESCRIPTION	..INFLUENCING.. ...VARIABLE....	GUIDELINES MIN. MAX.	
1100			IDENTIFY PROJECT SCOPE			
1100	010		READ THE PHASE GUIDELINES	TEAM MEMBERS	3.0	5.0
1100	020		DEFINE SCOPE/ASSUMPTIONS		4.0	5.0
1100	030		OBTAIN USER APPROVAL		1.0	2.0
1100	040		DEFINE USERS	USER DEPTS.	1.0	4.0
1100	050		ESTABLISH INDEX		1.0	2.0
1300			CONDUCT THE INTERVIEWS			1100
1300	010		FORMULATE QUESTIONS		2.0	10.0
1300	020		COORDINATE & CROSS CHECK		1.0	2.0
1300	030		CONDUCT THE INTERVIEWS	INTERVIEWS	2.0	4.0
1300	040		REVIEW AND DOCUMENT	INTERVIEWS	1.0	1.0
1300	050		SUMMARIZE RESULTS	INTERVIEWS	1.0	2.0
1300	060		REVIEW RESULTS	REVIEWERS	1.0	3.0
1400			ANALYZE DOCUMENTS/OUTPUTS			1100
1400	010		DESCRIBE THE DOCUMENTS	DOCUMENTS	1.0	2.0
1400	020		ANALYZE THE DOCUMENTS	DOCUMENTS	1.0	3.0
1400	030		DESCRIBE REPORTS/OUTPUTS	OUTPUTS	1.0	3.0
1400	040		ANALYZE OUTPUTS	OUTPUTS	1.0	2.0
1900			CREATE THE END DOCUMENT			1300 1400
1900	010		REVIEW THE WORKING TABLES		8.0	12.0
1900	020		CREATE THE END DOCUMENT		24.0	30.0

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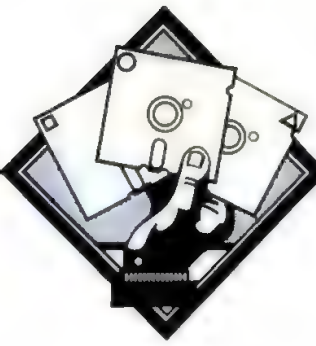
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mentation, consists of typed rather than typeset text and screen samples, with no tutorial or examples of printed reports.

After a project, or work breakdown structure, is divided into phases, the phases are defined through Option 1 on the menu: each phase is given one or more tasks, and each task can have up to four dependent tasks, which are listed on the printed WBS report created by *Estiplan*. But for detailed scheduling, you must direct your data to one of AGS's project control systems on the mainframe.

Also under Option 1, each task is assigned up to nine subtasks, and it is at the subtask level that you enter such influential variables as "team members," "documents," and "interviews" with low and high estimates, or guidelines, for each. A guideline is simply a decimal number between 0.1 and 99.9 that represents the elapsed time in hours (not man hours) allowed for the task. Throughout this process, *Estiplan* updates the file each time you complete the entries for a single task. I cannot report on how long it would take to make these entries or wait for file updates, since the demo disk did not allow me to select Option 1.

After defining all tasks and subtasks through Option 1, you can enter specific resource identifications, hourly rates, and hours estimated through Option 2. *Estiplan* will calculate the total number of hours (low and high values) by multiplying the number of influencing variables times the number of hours entered as guidelines. In other words, if a given subtask requires four team members and is assigned an expected value of 5 hours, then the total number of expected hours (for costing) will be 20.

The screens and reports created by *Estiplan* are simply formatted columns of text

and numbers; sideways and wide (132-column) printing options are not supported. If your printer handles graphics, *Estiplan* can produce vertical bar charts that compare low and high values estimated for each phase's hours or costs.

Summary

Estiplan is simply a PC-compatible front-end to what may well be one of the

largest automated project management systems in the world, requiring a mainframe for thorough project control. Unable to test the initial data entry process or to view the ultimate mainframe output, I cannot fairly judge the full value that *Estiplan* offers over other systems. However, if you have one of the other AGS mainframe systems, then you will find *Estiplan* a useful extension.—Sharyn Venit

PLANTRAC: MAINFRAME SOFTWARE FOR MICROCOMPUTERS



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Traditional mainframe software differs from microcomputer software in philosophy as well as size. Mainframe programs are usually large, and they frequently use input/output devices extensively. Printer entries describe every action mainframe programs take, and mainframe programs move data in and out of disk storage frequently, and automatically save your data when you pause. Mainframe programs generally demand highly sophisticated users—specialists who accept input from the people they work for and return printed reports. Often, commercial mainframe software isn't sold, instead it's

● This Activity-on-Arrow Chart shows task interrelationships (see p. 272).

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EVALUATION OF PLANTRAC

2-1-1984 (2) TIME NO. = 21 FEB 84 NETWORK = G123 SELECTION 2 SEQUENCE 5 VERSION 37 PAGE NO. 1

ACTIVITY ON ARROW - DEMONSTRATION NETWORK

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OF MAGNETIC EVALUATION

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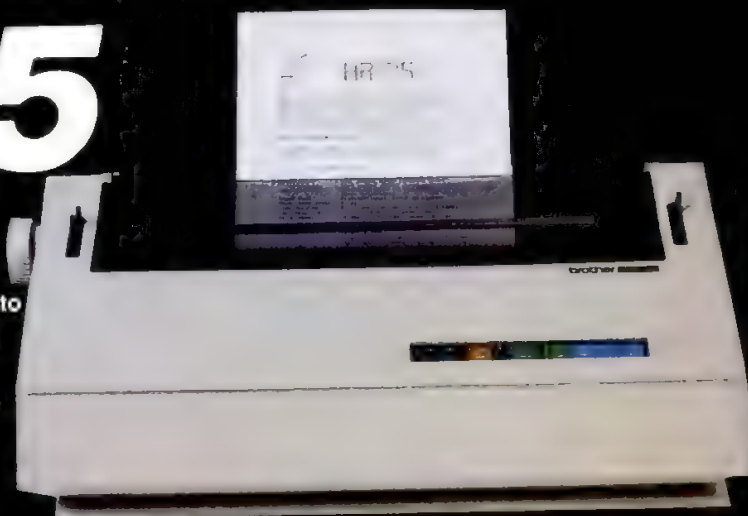
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PLANTRAC LOGS
EVERYTHING YOU DO
ON THE PRINTER. THE
AUDIT TRAIL IT CREATES
CAN BE INVALUABLE.
BUT BECAUSE I HAD NO
OPTION ABOUT USING
THE PRINTER, I FELT I
WASN'T IN CHARGE.

licensed on an annual basis. The license fee usually also covers program updates and high-level technical assistance.

Plantrac could be considered mainframe software for microcomputers. As with traditional mainframe software, you buy an initial license to use *Plantrac*'s 1.4 megabytes of program code. The fee is \$3,000 (yes, 3 thousand dollars) a year, and you pay an additional \$1,000 a year for program updates and telephone support. Clearly, this software is designed for people who must do a great deal of complex planning.

Getting Started

Computerline Limited has been marketing *Plantrac* in versions for CP/M and Radio Shack computers since 1980. *Plantrac* for MS-DOS is a generic product that runs on a wide variety of microcomputers. It does not take advantage of any of the PC's graphic capabilities or special function keys, but neither does it require special installation. To start, I just copied the six program diskettes into a subdirectory on my hard disk and typed RUNPERT. If you want to use expanded or compressed print in your charts, you can save the printer commands to use in a *Plantrac* print file, but otherwise the program is ready to

run. *Plantrac* does not need a special printer; it will drive most plotters with simple ASCII characters.

Since *Plantrac* is broken into many modules and spread over six distribution diskettes, it requires only a small amount of RAM. The manual says you can run the program in systems that have two disk drives, but I think you need a hard disk for practical operation on a PC.

Documentation

Like the program itself, *Plantrac*'s manual is generic. It gives no special instructions for using the software under MS-DOS or PC-DOS and offers few specific instructions of any kind. No tutorial takes you through examples using the program. But one section does describe elementary PERT chart creation and computer operation.

The manual has no glossary or index. More descriptions and helpful hints would have made understanding how to operate *Plantrac* much easier. The manual says that you should turn on the printer before you start the program, but it doesn't make it clear that if you do not do so, the program crashes almost as soon as it signs on. You may boot the program and get only a mysterious message saying "device timeout in line 3," with no hint in the manual that you need to turn on the printer.

Considering *Plantrac*'s complexity and the program's large number of options, the manual is only just adequate. In its defense, the company maintains that the software is meant to be used by experienced planners. I wonder, however, how they became experienced with so little help from the manual.

Plantrac is menu driven, but the menus operate in a page fashion; one vertical list of selections leads to another. The pro-

gram doesn't use the prompted menu mode found in *1-2-3*, *Multiplan*, and other modern PC software. I found myself literally drawing maps on scratch paper so that I could find my way back to a particular menu. The manual contains no network diagram of the menus.

Case Study

Plantrac can run all the activities in PC's case study. The charts called for in the study are standard items in the *Plantrac* menu, and inserting and deleting tasks is simple and fast. If you tried to do the case study using a machine equipped with only floppy disk drives, disk swapping would add hours to the job. The only limitation I found was in trying to tease the

LIKE THE PROGRAM,
PLANTRAC'S MANUAL IS
GENERIC. IT GIVES NO
SPECIAL INSTRUCTIONS
FOR USING SOFTWARE
UNDER MS-DOS OR PC-
DOS AND OFFERS FEW
SPECIFIC INSTRUCTIONS
OF ANY KIND.

information I needed on how to run the reports from the manual and the menus.

Data Entry and Operation

Data entry and editing are important features of a management program. The ability to produce the kinds of reports you need is the most important overall attribute of program management software, but getting the data in right and being able to modify it is also important, especially to the person running the program. *Plan-*

ACTIVITY ON ARROW - DEMONSTRATION NETWORK

С. 37

6 12 7 03 33 84 97 07:45:53

.....

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PLANTRAC SUBPROJECT G123 VERSION = 37 TIME NOW = 2/21/84

PAGE 1

ACTIVITY ON ARROW - DEMONSTRATION NETWORK

2- PLANNED = --) CRITICAL = ==) IN PROGRESS = ++) DUMMY = ..) HAMMOCK = ::)

COMPLETED = xx) KEY = 99)

- Plantrac's Gantt chart uses primarily alpha codes to plot task progress against time.

trac's data entry module does a good job of checking your data for consistency and duplication of events. The screen gives

you a clear picture of what elements of information you need for each event. You can describe each activity with big labels and attached comments.

In line with the program's mainframe philosophy, the system printer lists each event as you enter it, and the program

saves it to disk. So, without a fast printer and a disk drive, entering a long list of events can be tedious. And if you work at home or in a quiet office, the printer springing to life every minute or so can disturb those around you. Eventually, you learn that *Plantrac* logs everything you do

on the printer. The audit trail it creates can be invaluable, but the delay and noise can be irritating. Somehow the fact that I had no option about using the printer made me feel that I wasn't in charge.

Good News

Despite all my gripes, *Plantrac* really delivers in the area of reports. You can get Gantt charts, PERT charts, and (with a plotter) color network drawings. You can

PLANTRAC COULD
BE CONSIDERED
MAINFRAME SOFTWARE
FOR MICROCOMPUTERS.
CLEARLY, THIS SOFTWARE
IS DESIGNED FOR
PEOPLE WITH A GREAT
DEAL OF COMPLEX
PLANNING TO DO.

display specific data elements such as costs (actual or budgeted) or manpower in bar charts and histograms. The program will sort data elements in the project events in almost any imaginable combination, so you can arrange information according to various dates, resources, event descriptions, event types, cost codes, and/or responsibility codes. You can adjust work weeks in several ways, and you can enter holidays and other work limitations when you go through the menus to design the report.

With *Plantrac* you can examine projects to see what happens to time if you leave the budget level and what happens to expense if you expedite some actions. You can impose not-later-than or not-earlier-than dates and ask the program to

modify the activity schedule according to priorities you establish. As you use the various *Plantrac* options and create reports, you can store the report formats so that you can use them again with modified data or for another project.

The popularity of spreadsheets has proven that people like to do "what-if" comparisons on computers. *Plantrac*'s "what if" capability is extensive, and its ability to display differences is excellent. You can construct network diagrams of the same project using two different sets of constraints (timing or cost, for example) and then ask the program to show you only the differences.

Of course, it takes more than a few keystrokes to create these reports. Some appear only after you've made many tedious trips through menus and several trial runs, but the program can do the work if you give it the right instructions.

Other Computerline Limited products allow you to transfer files between *Plantrac* and such popular programs as Lotus's 1-2-3 and Ashton-Tate's *dBASE II*, print very detailed cost reports, or give you a WBS control system.

Tops in Planning

Obviously, since *Plantrac* has been selling under the present marketing scheme, it isn't overpriced for the market. The present human interface and the documentation need to be improved; a company spokesperson says that these problems have been remedied in version 4.0, to be released soon. But if you want the most capability and flexibility available in project management software and plan to use the program extensively and regularly (so you don't forget how), *Plantrac* should be on your list for careful consideration.—Frank J. Derfler, Jr.



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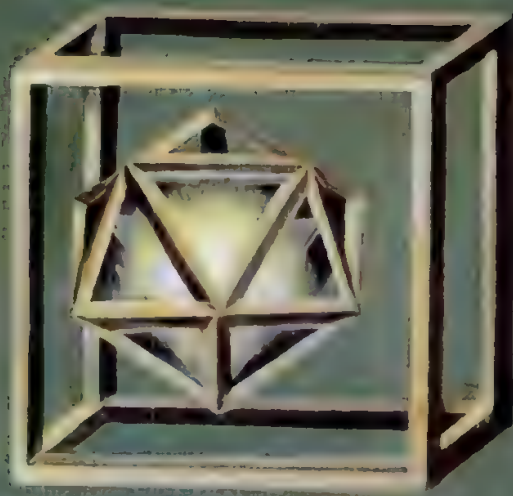
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Symphony
Versus
Framework

THE CORPORATE SHOWDOWN

At a series of seminars last summer, microcomputer experts from the Fortune 1,000 compared Symphony and Framework head to head. Here are their evaluations.





J. CHAN
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● THE CORPORATE SHOWDOWN

Lotus Development Corporation's *Symphony* and Ashton-Tate's *Framework* have generated considerable enthusiasm. They are the most exciting and talked-about business applications software since Lotus's 1-2-3.

Symphony and *Framework* are billed as the answer to a big problem faced by microcomputer users: how to combine the five basic applications (word processing, database management, spreadsheets, graphics, and telecommunications) into an integrated whole. A completely successful integration of these functions would mean the end of intermediary files. No longer would you have to pore over instructions on how to import, export, and translate files. Instead of learning three, four, or five different packages, you could simply use a single package with a consistent

command structure to perform any analysis or create any type of report. The microcomputer would become a workstation and the integrated package a "toolbox" containing everything that any user, regardless of requirements, would need.

Many powerful integrated packages are on the market—*Aura*, *Smart*, and *Enable*, among others. However, *Framework* and *Symphony* are backed by the industry leaders and multimillion-dollar advertising budgets. The two packages were released at the same time, and at this writing, they are among the top ten on Softsel's "Hot-list" of best-selling business software. Many people view the two as direct competitors and would like to know which package is better and whether they perform as advertised.

Our consulting firm, MicroTrek Enter-

prises, tried to answer these questions by holding a comparative demonstration and benchmarking seminar billed as "*Symphony* vs. *Framework*—The Showdown."

The Showdown

Evaluating new software is a difficult undertaking, beset by personal bias and errors in testing techniques. We did not believe that "high-tech," hairsplitting tests, whose results only an engineer could love, would serve our purpose. Instead, we developed a series of exercises and simple benchmarks that would test *Symphony* and *Framework* under normal operating conditions. The important ingredient in the Showdown was the expertise and influence of the participants. Hundreds of microcomputer managers and systems specialists, representing primarily Fortune 1,000 companies, attended the seminar. Many of these people make microcomputer hardware, software, and training decisions for their companies, and their opinion of a product can determine its success in the marketplace.

We began the seminars, which we limited to groups of 8 to 12 apiece, in the second week of July. Because neither product was yet widely available, we used beta-test versions during the first few weeks. The demonstrations were not hands-on. Instead, demonstrators exercised the programs as the participants watched four video monitors.

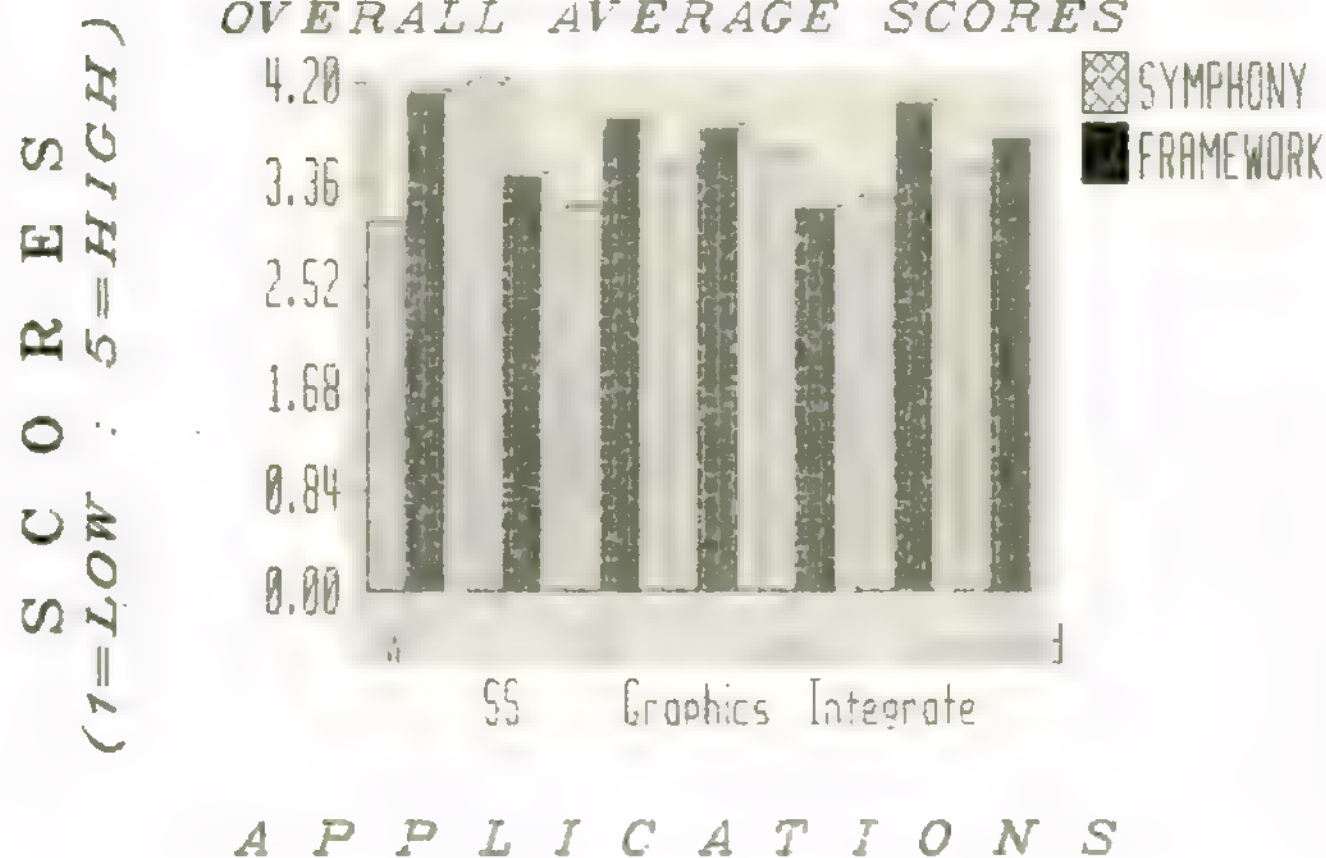
The seminar leaders demonstrated *Framework* and *Symphony* competitively, function by function, using such basic exercises as moving text and creating formulas. They then illustrated such differences as *Symphony*'s extended character set and *Framework*'s italics on the screen. Finally, they compared speed of operation using benchmark tests.

We asked the participants to score the products on a scale of 1 to 5 (5 was the best) and to compare *Framework* and *Symphony* both with one another and with standalone packages.

We held several Showdowns during July and August. They ultimately yielded

SYMPHONY VS. FRAMEWORK

OVERALL AVERAGE SCORES



● The graph above illustrates the average overall scores that each product received in each functional area. These averages are an interesting counterpoint to the preference graphs. They indicate that while the evaluators did perceive significant qualitative differences between *Framework* and *Symphony* in certain functional areas, the products scored very closely on a combined basis.

147 valid legible scorecards. We tabulated the scores using a database package.

The Results

Overall, our seminar participants preferred *Framework*. They liked *Framework*'s features better in three of the five functions (word processing, database management, and graphics) and its overall integration and ease of use. The participants cited several reasons for their scoring, but most emphasized *Framework*'s ease of use as the basis for their preferences.

Mark T. Oster, senior systems analyst at Philip Morris, said that "overall, *Framework* was easier to use." William Kaiser, a programmer/analyst at Marsh & McClennan, shared this view. "*Framework* is clearly easier to comprehend because of its one menu and its ease of switching between frames and disk drives. *Symphony* users will have problems mapping out large spreadsheets; *Symphony* needs some modularity like *Framework*'s frames."

Although participants considered *Framework* easier than *Symphony*, they found both to be quite complex. "They are not for the beginner," said Roger Harrison, manager of systems development at SCM Corporation. "If I were a first-time user, I would be intimidated."

These programs are complex. They combine five separate applications programs with a sophisticated operating environment. In fact, some people expressed a desire to trade power for simplicity. When commenting on *Symphony*, Jim Grady of Consolidated Edison said, "I wish Lotus had just upgraded 1-2-3 and not tried to move into a new realm of complexity."

Word Processing

Participants expressed an overwhelming preference for *Framework*'s word processing module. They considered *Symphony*'s word processor slow and cumbersome. Priscilla Tate-Austin, chairperson of the New York PC User's Group Integrated Software Evaluation Committee,

Symphony vs. Framework Showdown Results of Benchmark Tests

	SYMPHONY	FRAMEWORK
	(in seconds)	
<hr/>		
Spreadsheet:		
Benchmark 1 (250 formulas)	5	6
Benchmark 2 (1,000 formulas)	4	15
<hr/>		
Word Processing:		
Search/Replace (50 times)	16	2
Reform Paragraph (50 one-line paragraphs)	9	1
<hr/>		
Database:		
175 Record Sort (alpha field)	15	3
175 Record Sort (numeric field)	5	3

The benchmark tests measured the speed of each program in the spreadsheet, word processing, and database modules. *Symphony* was clearly faster in spreadsheet recalculation. The gap between *Symphony* and *Framework* widens as the size of the spreadsheet increases. These tests were performed on equivalent IBM PCs. Neither PC was equipped with an 8087 math coprocessor because *Symphony* does not support this coprocessor while *Framework* does.

Framework was much faster in the word processing and database benchmark tests. It appears that *Symphony*'s reliance on the spreadsheet as its primary operating environment makes it inefficient with nonspreadsheet functions. *Framework*, with its separate word processing and database frames, executes much faster.

This table compares the file sizes used in the benchmark comparisons. As the table illustrates, *Framework*'s "frame" orientation and its extensive operating shell result in larger files. The files that *Framework* creates for spreadsheets and databases are approximately four times larger than the corresponding *Symphony* files. *Symphony*, on the other hand, stores files in a spreadsheet format, which is inefficient for word processing documents.

said, "*Symphony* as a word processor is clearly inadequate," although others, such as Roger Harrison, were "surprised that its word processor is so full-featured."

Framework was much faster in the search-and-replace and rejustification tests. The first test required the programs to search for and replace a word occurring 50 times in a one-page document. The rejustification test asked them to change the left margin of the same document from

5 to 0 and then reformat the text.

Participants found *Framework*'s function key orientation superior to *Symphony*'s menus. In addition, they preferred *Framework*'s on-screen presentation of print attributes such as underlining and boldface, as well as the ease with which it created these effects.

Spreadsheet

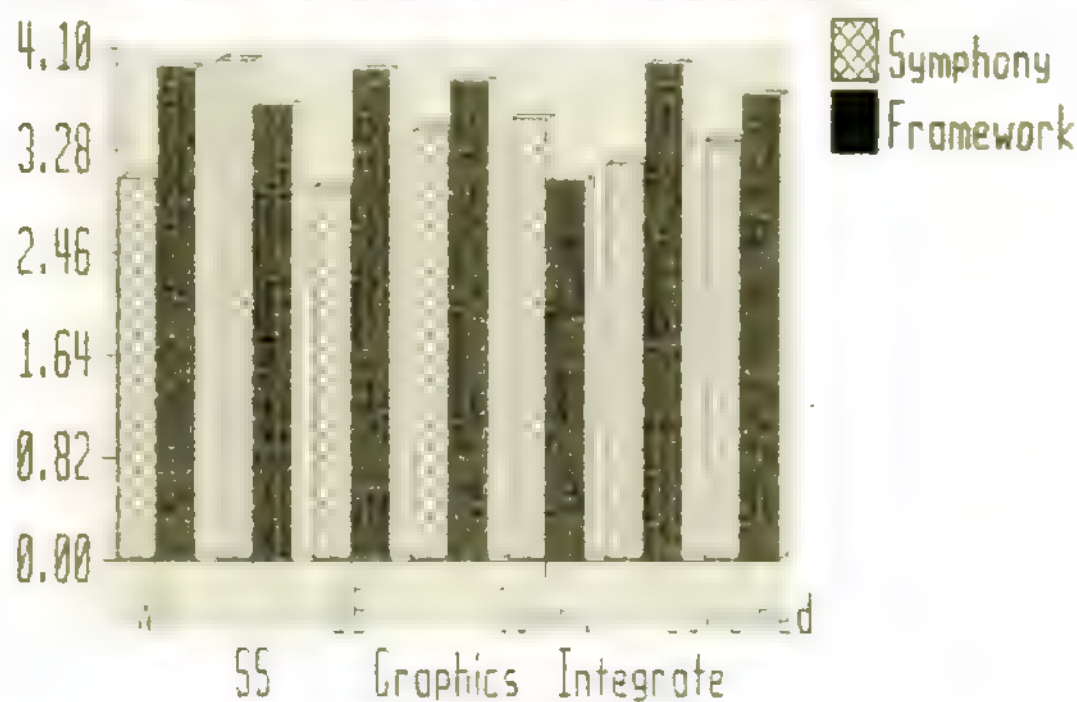
Appropriately for the heir of 1-2-3, *Symphony* was preferred in the spread-

● THE CORPORATE SHOWDOWN

SYMPHONY VS. FRAMEWORK

EASE OF USE AVG. SCORES

SCORES
(1=LOW : 5=HIGH)



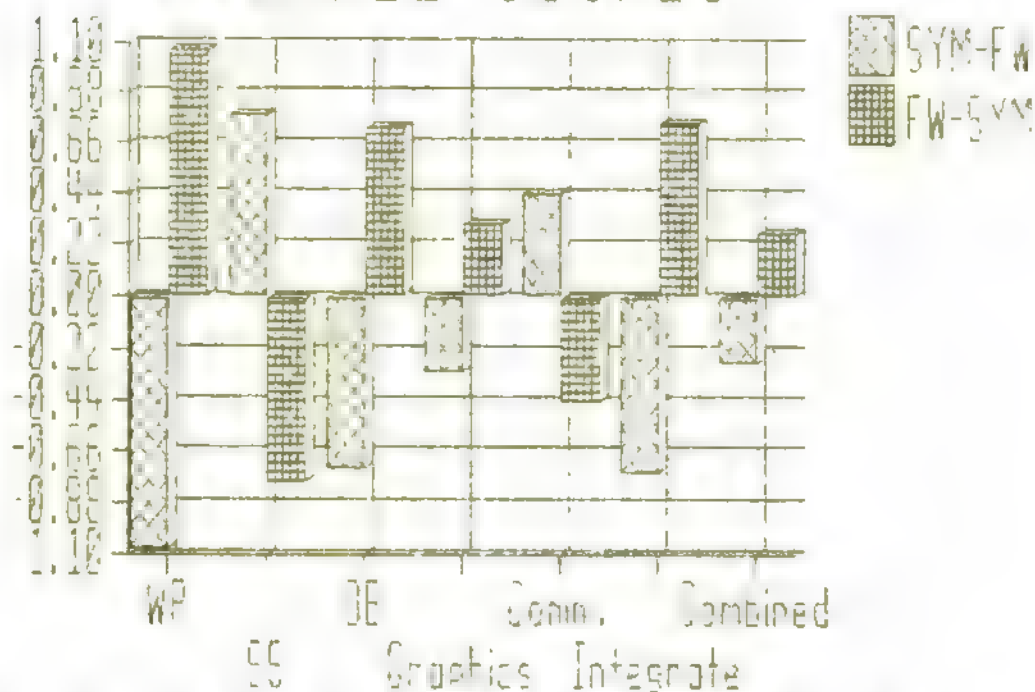
APPLICATIONS

● The ease of use average scores mirror the overall scores in every area. This result indicates that ease of use was a primary criterion used by the evaluators in rating both products. The relatively low combined scores for both products indicate that they were perceived as difficult to use.

SYMPHONY VS. FRAMEWORK

OVERALL SCORES

DIFFERENTIAL
AVERAGE SCORES



APPLICATIONS

● This graph highlights the functions in which participants found significant differences between Framework and Symphony. Each bar represents the difference between the average scores given to each product. Each applications area has two bars; they are mirror images of each other.

sheet category. The majority of participants said *Symphony* benefited from using 1-2-3's command structure while adding capabilities. Matt Buten of Kidder, Peabody said, "Our whole corporate group switched from 1-2-3 to *Symphony*. If you need a spreadsheet and communications, it's a great improvement, especially if you already know 1-2-3."

Symphony was faster in the spreadsheet benchmark tests, which consisted of two recalculation speed tests: a Fibonacci series and a "torture" test. The first series was a matrix consisting of 5 columns and 50 rows. Each cell was the sum of the two cells above it; all the cells depended on the value in cell A1. The second series was a 5-column by 200-row matrix in which the value of each cell was equal to 1.1 times that of the cell above it. All cells depended on the value in cell A1.

Framework's spreadsheet slowed down as the test matrixes got larger. In the first test, *Framework's* spreadsheet was only slightly slower than *Symphony's*, but in the second test it was more than three times slower.

Many participants considered the unwieldy file sizes that *Framework* routinely creates in the spreadsheet a significant disadvantage. *Framework's* spreadsheet benchmark test files were more than three times larger than *Symphony's*. "*Framework's* memory consumption constrains its use on the PC," said Peter Einstein of Avon Products. He would prefer to "stay with *Symphony* for its versatility and overall power."

However, the large number of participants (70) expressing no preference between the spreadsheets could indicate that many people do not need a spreadsheet of *Symphony's* proportions.

Database

Seminar participants preferred *Framework's* database manager over *Symphony's*. *Symphony's* database forms seemed to disappoint many of the participants. During the seminar, demonstrators created and manipulated input forms. In *Frame-*

● THE CORPORATE SHOWDOWN

work, "dragging" the input frame around the screen has no effect on the underlying database. To move a field in the database entry range, the equivalent action in *Symphony*, you must redefine the range names. Participants also found *Framework*'s easy-to-modify database structure an advantage.

The benchmark tests for the databases consisted of single-key sorts on a 5-field, 176-record database. *Framework* was much faster in both character- and numeric-key sorts. The source of the data was a *dBASE II* file that was imported into *Framework* and translated into *Symphony* through the utilities supplied with each program.

Both *Symphony* and *Framework* use RAM-bound databases. As in its spreadsheet, *Framework*'s database files were much larger than *Symphony*'s. However, the participants did not seem to care, even though a PC with 640K of RAM will only allow a *Framework* database of about 650 records (10 fields per record, 10 characters per field). *Symphony* allows at least twice that amount.

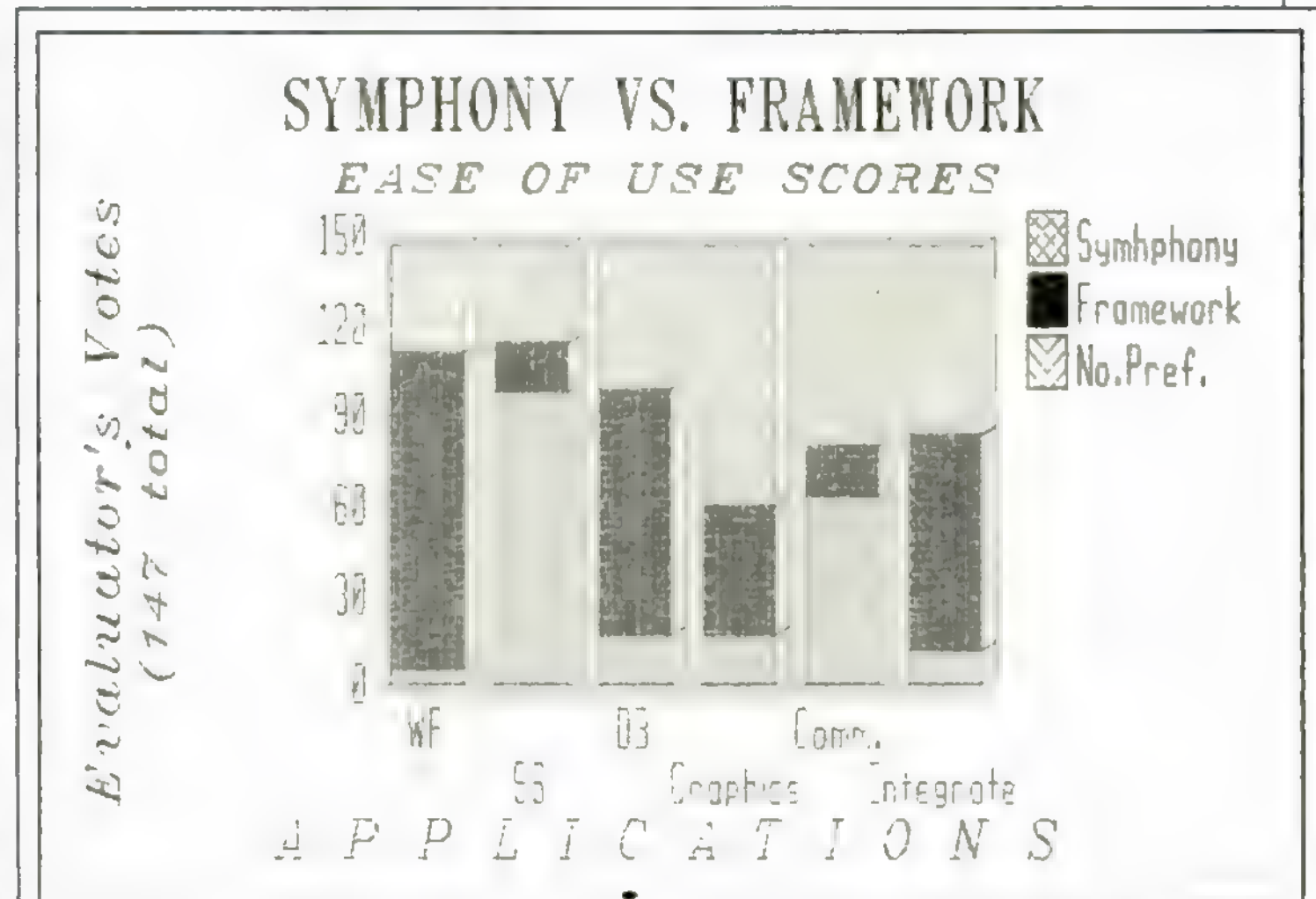
None of the participants, it seemed, considered either product a serious database manager. Gary Brunotte, microcomputer systems manager for CBS Publishing, said that "both products were weak in the database area" and that neither was "up to *Smart* and *Enable* in database capability."

Graphics

Although participants preferred *Framework* in both graphics areas evaluated, many people did not express a preference. Feedback during the seminar did indicate that the participants were impressed by *Framework*'s ability to pick up graph labels and titles automatically from the spreadsheet and by *Symphony*'s built-in high-low-close chart.

Telecommunications

In the area of telecommunications, participants preferred *Symphony* over *Framework* for two reasons. First, the evaluators



● These stacked bar graphs summarize the evaluators' preferences by functional area. Evaluators indicated a preference by scoring one product higher than the other. Raw scores were not taken into account. Participants clearly preferred *Framework* over *Symphony* in word processing, database management, graphics, and overall integration. They preferred *Symphony* in the spreadsheet and communications areas. The large number of evaluators expressing no preference (the scores given were equal) is indicative of the fact that both products were considered to be quite powerful in all areas.

found the *Symphony* communications module much better integrated and therefore easier to use. *Framework*'s Mite Module is obviously an add-on and its command structure and screen appearance do not resemble *Framework*'s. Second, they considered *Symphony*'s ability to capture incoming files directly on the spreadsheet superior to the Mite/*Framework* "bridge." Many saw the combination of *Symphony*'s powerful spreadsheet and tightly integrated communications as having great potential for financial applications. "We have reporting units scattered all over the United States," said Adam Belsky, a financial analyst for Sun Carriers. "Symphony's spreadsheet and communications capabilities give us a good applications development tool." Mark Oster of Philip Morris was also "very impressed by *Symphony*'s communications capabilities."

A large number of participants did not

express a preference for either product: The complexities of telecommunications may have made many people unable or unwilling to venture an opinion.

Why Integrate?

Symphony and *Framework* are designed to alleviate the compatibility problems that currently plague microcomputer software. Their publishers are hoping that tight integration of applications will lure users from other products. However, many evaluators' comments indicate that they have doubts about the two packages' ability to satisfy a broad range of basic applications needs. Richard Creeth, manager of small business micro product development at Deloitte, Haskins & Sells, doesn't expect to see users drop their favorite software. "The market for integrated software is probably the first-time user. The existing user market would probably prefer to integrate their existing

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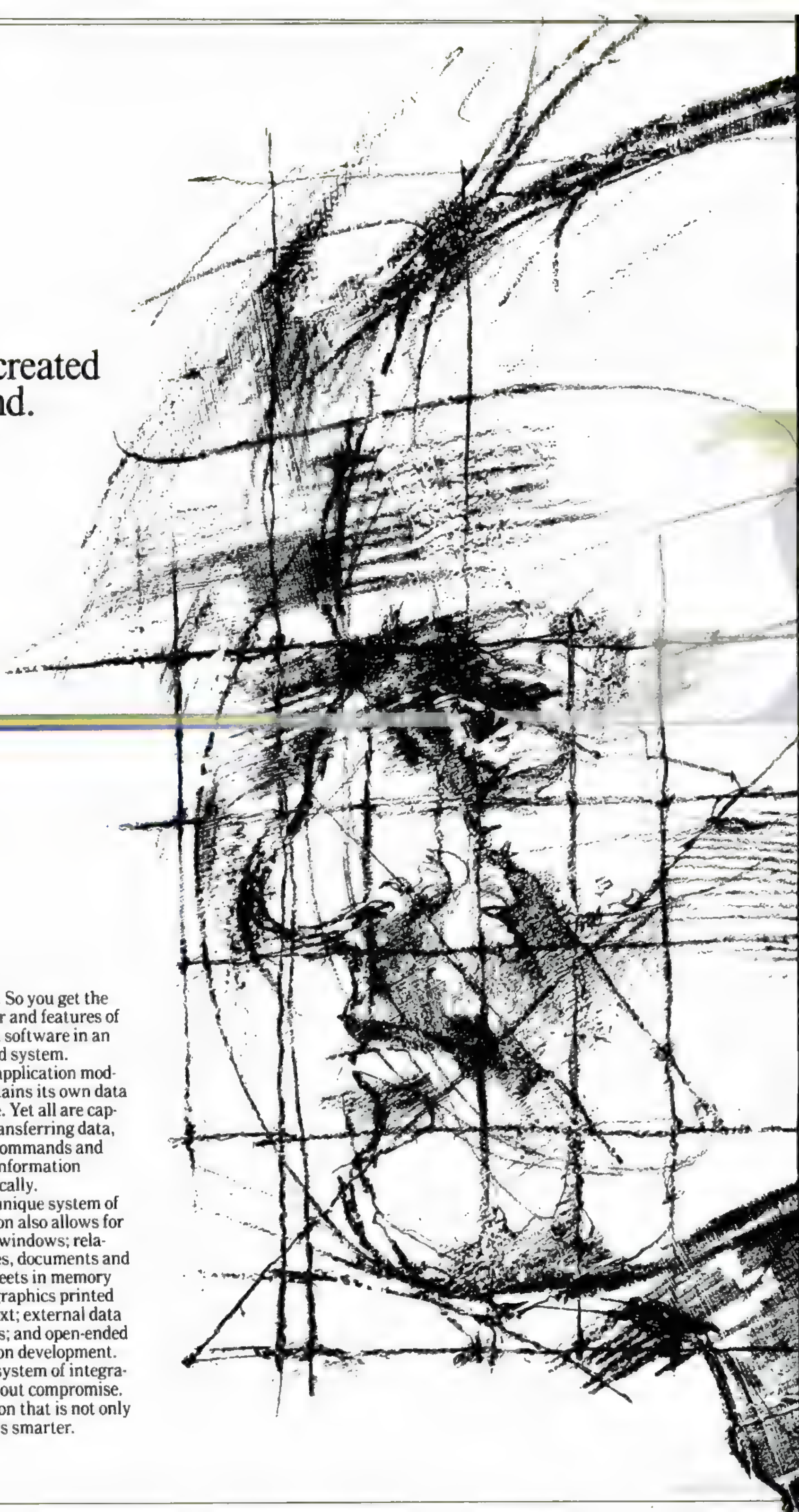
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● THE CORPORATE SHOWDOWN

applications." David Philips, project manager of the Pension Information Center at Metropolitan Life, shared this opinion. "I don't feel pressure from users to upgrade. People are happy with what they've got. Users are not sophisticated enough for *Framework* and *Symphony*." Creeth also said that such applications-oriented software as *Symphony* and *Framework* was "inappropriate for managing integration. Ultimately," Creeth believes, "operating systems should do the integration among applications, not an integrated applications package."

Not A Two-Product Race

Some participants expressed dismay that many people perceive the integrated software market as limited to a two-product race. "*Symphony* seems to have hit a few sour notes. I'm very disappointed in the final program, especially after having seen *Enable* and *Smart*. It appears locked in the spreadsheet mode," said Gary Brunotte, microcomputer systems manager

for CBS Publishing. "*Framework* looks easy to use, but it's a bit too flashy with all the frames. Ashton-Tate could have put more into the database, word processor, and spreadsheet. I hope people don't flock to *Symphony* and *Framework* because of *1-2-3* and *dBASE II*, but rather look at the other entrants like *Smart* and *Enable*."

A Few Editorial Comments

The questions which integrated software raises are complex. Showdown participants often did not appear to fully realize the implications that integrated software holds for office productivity. Participants did recognize the obvious benefits that *Symphony* and *Framework* offer for quick application-switching and data-sharing. However, the larger question of software standardization and compatibility in the modern office overshadows this narrow focus on integration for a single user.

The benefits of giving all users in an

organization a single, standard software package are enormous. It's much easier to support and use a single standard product than a multitude of products. A standard

Showdown participants often did not appear to realize the implications that integrated software holds for office productivity.

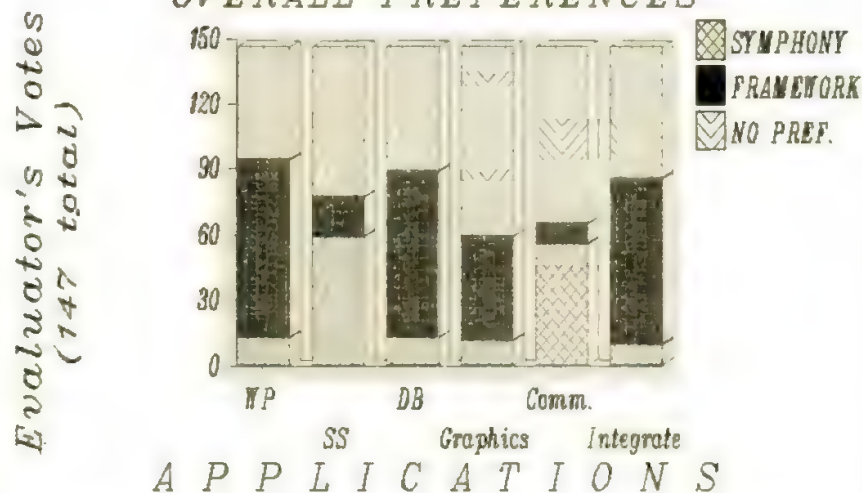
package also means users can easily exchange data. Of course, such a package must satisfy many radically different needs. *Symphony* and *Framework* can't fill this role: their abilities are too uneven. Although environment software programs such as *Windows*, *Desq*, and *TopView* permit easy data exchange, they may promote less standardization of applications software.

Software that becomes a standard must have a well-balanced distribution of features and power. Several integrated packages such as *Enable*, *Smart*, and *Aura* attempt to address this problem by joining powerful, similarly structured applications programs using an integration module that permits data interchange. The market will ultimately determine whether integrated software is the answer to the software compatibility question. ■

Paul Goldner, Raymond Hood, and Michael Wilding are president, treasurer and chief executive officer, respectively, of MicroTrek Enterprises, Inc., a New York-based corporate training and consulting firm. MicroTrek has a reputation as a leading independent authority on integrated software and as an authorized training center for software companies.

SYMPHONY VS. FRAMEWORK

OVERALL PREFERENCES



● With its one menu and ease of switching between frames and disk drives, people found *Framework* easier to use, and felt *Symphony* would benefit from some modularity like *Framework*'s frames. They found both programs quite complex, however, and would be willing to trade power for simplicity.

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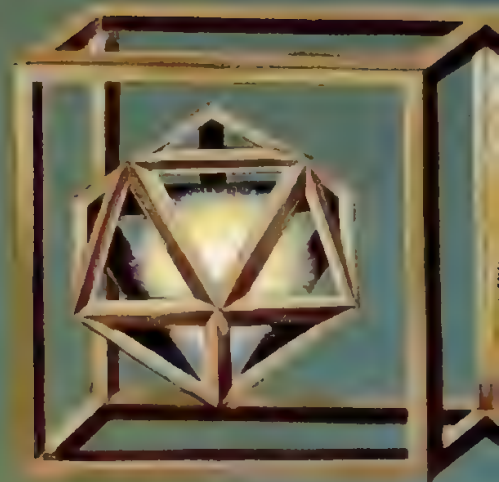
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Symphony
Versus
Framework

THE APPLICATIONS FACE-OFF

Is Framework in the word worker's camp, Symphony in with the number crunchers? Here PC tests the accuracy of these characterizations.



● FACE-OFF

In the battle between Ashton-Tate's *Framework* and Lotus's *Symphony*, *Framework* is reputed to have more of a word processing, or verbal, orientation, while *Symphony* appears geared toward spreadsheets and other financial, or numerical, functions. Are these assessments accurate, or are they merely marketing ploys by the publishers of the two packages? David Kruglinski and I decided to find out.

No one test can illuminate all the features of an integrated product. Thus, we attempted to demonstrate the strengths and weaknesses of *Symphony* and *Framework* using a combination of typical integrated software functions in a complex application.

Our Application

To compare *Symphony* and *Framework* in the broadest context, we designed an application that integrates the various program functions. Our comparison of the two packages is not a feature-by-feature duel. Your application needs, not the packages' individual features, will determine your preference for one program over the other.



The first part of the application involves an employee database for a hypothetical company: SymFrame Software, Inc. The database has one record for each of SymFrame's 512 employees. Each record includes the employee's last name, first name, department, salary, and hire date.

The tasks were (a) to sort the database alphabetically by

	A	B	C	D	E	F	G
1	(\$ IN 000'S)						
2							
3							
4							
5	Revenue						
6	SymFrame		15758	15789	16529	16335	64411
7	PhonyWork		10506	10527	11020	10890	42943
8	Miscellaneous		200	200	209	207	816
9							
10	Total		26464	26516	27758	27432	108170
11							
12	Expenses						
13	Materials		7146	7160	7494	7407	29207
14	Wages		5820	5995	6175	6360	24350
15	Postage		3016	3023	3165	3127	12331
16	Other		5609	5623	5887	5817	22936
17							
18	Total		21591	21801	22721	22711	88824
19							
20	Pretax Profit		4873	4715	5037	4721	19346
						SS:	1/1

● The spreadsheet figures that the authors used to test the capabilities of *Framework* and *Symphony* include the above revenue & expense statement for all divisions combined.



name; (b) to, as of December 31, 1984, determine the number of employees who have been with the company more than 10 years, between 5 and 10 years, and less than 5 years; (c) to create a pie chart from the results of step 2, showing the distribution of employees by length of service; (d) to create a memo to be sent by the personnel coordinator to the company president, incor-

porating the results of steps 2 and 3; and, finally, (e) to create a form letter congratulating employees who will be reaching their tenth anniversary in the 2 weeks beginning November 4, 1984, and to print the form letter using information obtained directly from the employee database.

SymFrame Spreadsheets

The second part of the application involves spreadsheet consolidation. SymFrame Software is a corporation comprised of three divisions, located in Idaho, Iceland, and Lichtenstein, respectively. Each division develops its own quarterly statement of revenues and expenses. Headquarters consolidates the individual divisional statements into a corporate total, using two formats: a consolidated company spreadsheet that shows total company revenues and expenses by quarter, and a consolidated statement that shows the full-year revenues and expenses by division and determines the company total. The spreadsheet consolidation taxes the full analytical capabilities of neither *Symphony* nor *Framework*. We included it because we believed that the spreadsheet commands and functions of the two programs were both capable and comparable in ability.

	A	B	C	D	E	F
1	(\$ IN 000'S)		SYMFRAME SOFTWARE, INC.			
2			REVENUE & EXPENSE STATEMENT			
3			BY DIVISION			
4			Idaho	Lichtenstein	Iceland	Full Year
5	Revenue					
6	SymFrame		39646	15553	9212	64411
7	PhonyWork		26431	10370	6142	42943
8	Miscellaneous		503	197	116	816
9						
10	Total		66580	26120	15470	108170
11						
12	Expenses					
13	Materials		17977	7052	4178	29207
14	Wages		6287	3335	14728	24350
15	Postage		7590	2978	1763	12331
16	Other		14117	5539	3280	22936
17						
18	Total		45971	18904	23949	88824
19						
20	Pretax Profit		20609	7216	-8479	19346
					TMSS:	6/5

● The same revenue & expense statement broken down by division. These figures were also broken down into quarterly results for each of the three divisions.



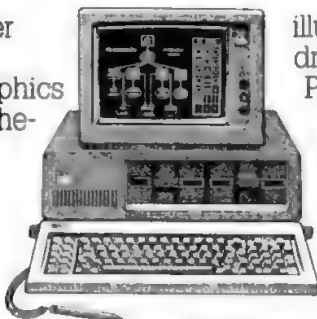
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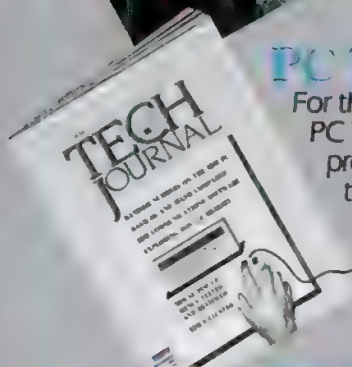
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Symphony V

Symphony sympathizer Ed Baras and Framework aficionado David Kruglinski benchmark tested the two rival packages using the same complex application.

When I first heard that *Symphony* is for number-crunchers whereas *Framework* is for word-workers, I wondered whether the assertion was accurate. To test it, I taught a word-worker to use *Symphony*.

In less than 20 minutes, the secretary I instructed was able to use the basic functions of *Symphony*'s word processor. During the short lesson my pupil learned to enter, edit, and delete text, copy and move words and paragraphs, and print the results. Here was the quintessential word-worker, someone who had never developed a spreadsheet, using *Symphony*'s word-oriented features in no time at all.

Symphony is certainly a good package for number-crunchers, but in many ways it is no less a package for word-workers. In fact, *Symphony* and *Framework* have much in common. Certainly, the two have marked differences, but their battle lines are not simply along the lines of words versus numbers. The real battle between the two programs lies in their capacity and ease of use.

Power Struggle

But the battle is ultimately a stand-off. One program will not defeat the other. Their strengths are different even though they share many features. Whether *Sym-*

phony is the better software for you depends on how much power and capacity your applications demand.

Symphony incorporates five work environments: spreadsheet, word processing, database management, business graphics,



and telecommunications. You can use each of these functions by themselves and also together as an integrated unit.

The key to *Symphony*'s integration is that all five work environments share a common data storage area, a rectangle of cells comprised of 256 columns and 8,192 rows. The data storage area is like a huge warehouse with windows of various shapes and styles along its walls. It houses all the data you use or create with *Symphony*. The stored data are available to

each of the environments through the windows.

Imagine that you are standing on the outside of a warehouse, looking at a particular pile of widgets through a window on the building's east side. You walk to the south side of the building and peer through a different window at the same pile of widgets. The different glass in this window makes the widgets look different. Standing inside the warehouse, you see that they are the same, but outside, through different windows, your perspective is altered.

Varied Perspectives

The windows in *Symphony*'s data storage area function in much the same way. The five types of windows, Sheet, Doc, Form, Graph, and Comm, correspond to the program's five work environments. They offer varied perspectives on the stored data.

Creating a database like the SymFrame personnel file involves two environments, Sheet and Form. To begin my database, I entered the field names, field types (label, number, date, and so forth), and field lengths as a column of label cells in the spreadsheet.

Next, I pressed a key to switch the win-

(Continued on p. 300)

SFramework

Surprisingly, when the smoke cleared, the real battle lines between Symphony and Framework were drawn between the programs' capacity and ease of use.

Despite the widespread notion that *Framework* is exclusively word-and-idea oriented, this package is considerably more than a fancy word processor with an outlining feature.

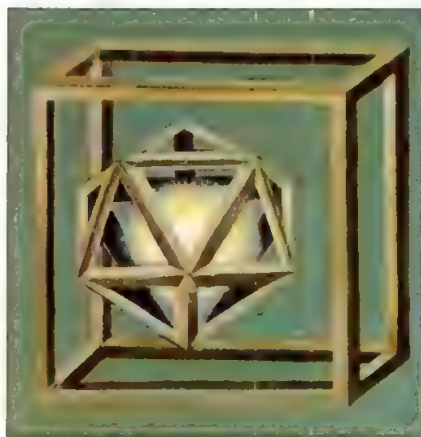
The SymFrame Corporation example doesn't tax *Framework*'s number-crunching ability, but it does demonstrate most of its integration features. It's true that *Framework* has some capacity and speed limitations, but it offers all the spreadsheet functions you expect, plus some others that you will find a pleasant surprise.

Framework's Heritage

Framework is a true integrated package that performs as if it were more than the sum of its parts. It builds on the spreadsheet and graphic principles pioneered by *VisiCalc* and *1-2-3*, but adds a word processor comparable to most standalone packages and throws in an outlining function like that of *ThinkTank*. Everything fits together beautifully because the same commands work throughout the package. You move text blocks the same way you move groups of spreadsheet cells, and the search-and-replace function works in a document, a spreadsheet, or a database.

Framework is also distinguished by its use of the "direct leverage principle," which dictates a natural, commonsense

user interface incorporating pointing and doing. Choices are available on pull-down menus, and you use a few clearly defined keys to make things happen. This interface gives you the illusion that the computer isn't there, that you're working directly on



your documents and worksheets. The screen seems to be a desktop; the documents and worksheets, frames.

Frames

The frame is *Framework*'s basic unit, the essence of *Framework* integration. It is derived from the PARC window, a concept very popular in the software world today. The term window is loosely defined because various software manufacturers use the concept differently. A

window is merely a rectangular region on the PC's screen in which you can see some associated program's data. A frame, on the other hand, exists whether it's on the screen or not. It's a highly structured entity that includes data, formulas, a name, a size, and a position for the part visible on the screen.

Symphony and other spreadsheet-based programs work with one large sheet at a time. This sheet often consists of several tables and/or documents at different locations. *Framework*, on the other hand, reserves one frame for each table. You can display several of these frames at once, and, more importantly, you can link the frames together. The SymFrame income statement example demonstrates this ability nicely.

In *Framework*, a frame can also incorporate other frames in a nested hierarchy. This ability not only allows printed documents to contain databases, spreadsheets, and graphs, but it allows you to effectively organize projects within *Framework*. You can conveniently group all project notes, spreadsheets, graphs, and databases in one "containing" frame. As the project progresses, you can shuffle the component frames as necessary and copy data to and from other, separate frames. Outlining is a

(Continued on p. 301)

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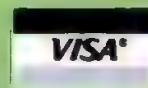
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● SYMPHONY

Inserting Record 1
Enter LAST NAME

New Record

LAST NAME _____
FIRST NAME _____
DEPT _____
SALARY _____
HIRE DATE _____

EMPLOYEE 25-Sep-84 01:11 PM

Figure S1: The Symphony "form" used to enter, view, and edit data records.

A28: 'LAST NAME

	A	B	C	D	E	F
	LAST NAME	FIRST NAME	DEPT	SALARY	HIRE DATE	
28	PALMER	JON STUART	6	15000	14-Feb-55	
29	MONSEGUR	FRANCES LOTTIE	1	10000	17-May-55	
30	JACOBSON	ARTHUR CHARLES	8	59000	20-Jun-55	
31	PEARSON	THEODORE LANADO	10	10000	06-Oct-55	
32	TOBIN	RONI LIN	8	38000	12-Nov-55	
33	ODEN	TINA ANN	3	25000	22-Mar-56	
34	HILL	CONSUELO ENCARNAC	8	10000	27-Apr-56	
35	HOLIFIELD	RAYMOND	10	12000	24-May-56	
36	PESTERKOFF	JOHN R	2	108000	12-Jun-56	
37	FISHER	DOLORES CAROL	8	44000	14-Mar-57	
38	GLENN	PETER ALLAN	9	44000	27-Jun-57	
39	LUCCHINI	ETHEL GERTRUDE	8	13000	08-Nov-57	
40	SIFFERMAN	DOROTHY ALEXAN	4	88000	30-Apr-58	
41	MALLET	SHARON L	7	10000	30-May-58	
42	SHIOTA	STEPHEN D	5	33000	03-Jul-58	
43	PISCOVA	CHARLES	10	20000	06-Jul-58	
44	AGUILAR	JACQUELINE ANN	5	53000	22-Mar-59	
45	LICON	LORENA KAY	4	55000	05-Apr-59	
46	MOY	LEATRICE JOY	1	40000	09-Apr-59	

26-Sep-84 11:01 AM

Figure S2: This chart is an example of how Symphony's Sheet environment allows the package's users to view spreadsheets in tabular form.

dow's type from Sheet to Form. I was still using the same window, but I attached a different characteristic to it.

Each environment has a unique menu of commands, which you invoke by pressing the F10 function key. In a Form window the Generate command creates a database from the field definitions I entered in the spreadsheet. If I indicate the range of spreadsheet cells that contain the field definitions, the Generate command takes care of the other details of database creation.

The result is a data entry screen, or "form" (Figure S1) used to enter, view, and edit data records. A form houses a single data record, and the database is the collection of forms. Entering a personnel record is simply a matter of filling out a form, and editing data is a matter of changing the information on a previously filled-out form. In the Form environment you can also sort, locate, and select particular groups of records.

You can see how different environments share the same data by switching the window type from Form back to Sheet. While the Form environment lets you view records one at a time, the Sheet environment stores records as rows in a table. As you enter a new record onto the data entry screen in the Form environment, *Symphony* places your entries into the spreadsheet's next available row. The Sheet environment enables you to view your spreadsheet in tabular form (Figure S2). It also enables you to use commands and functions available in the spreadsheet mode to analyze the database.

Categories of Data

The first step in the SymFrame, Inc., exercise was to categorize the employees into three groups: employees who have been with the company less than 5 years, those who have been employed by the firm between 5 and 10 years, and those who have over 10 years' employment with the company. I used the database statistical function @dcount to tally the number

(Continued on p. 302)

● FRAMEWORK

natural outgrowth of this "frames within frames" concept. The lowest level frames contain text; *Framework* lists all the frame names in a numbered, indented outline form. You can then use the outline to quickly navigate to the correct text.

Integrating Frames

To complete the first part of the Sym-Frame project, I had to put myself in the place of the personnel coordinator of Sym-Frame Software. The president has requested a chart showing distribution of employees by service time. He is particularly interested in knowing the number of employees who have been with the company between 5 and 10 years. Like any good personnel manager, I have kept an up-to-date database that includes, for each employee, name, department number, salary, and hire date.

As shown in Figure F1, the employee database occupies its own frame. When I set up this database, I told *Framework* that I wanted a database frame, and so I was able to enter field names on the top line. I had to specify in advance the number of fields and the number of records, but I can change both at any time.

All the *Framework* options for specifying dates present some difficulties. As it stands, the hire dates are ASCII strings in the format "1984/11/01." This format allows me to sort by date and select records within date ranges. One alternative is to use a formula, such as @date(1984,11,1), which results in a display of Nov 1, 1984. It's easier for an operator to type in the string than the formula, but *Framework* finds the string more difficult to process.

The sample database contains 512 employee records. *Framework* allows me, with a minimum of menu-prompted keystrokes, to sort on any field, find matches in a particular field, find matches in any field in the database, and filter the database according to any field selection criteria. *Framework* performs all these tasks almost instantaneously.

I used the filtering function to group the

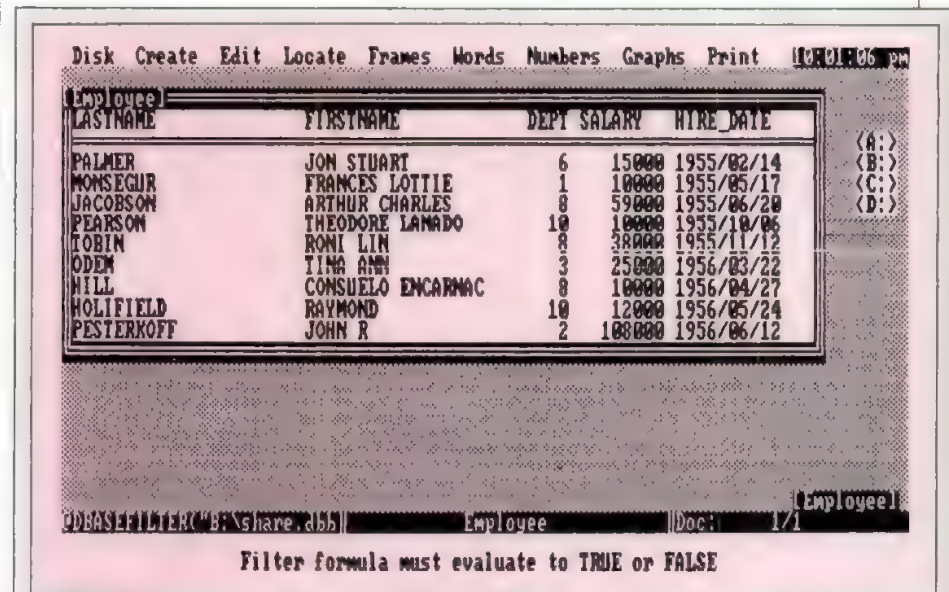


Figure F1: Framework's employee database occupies its own frame.

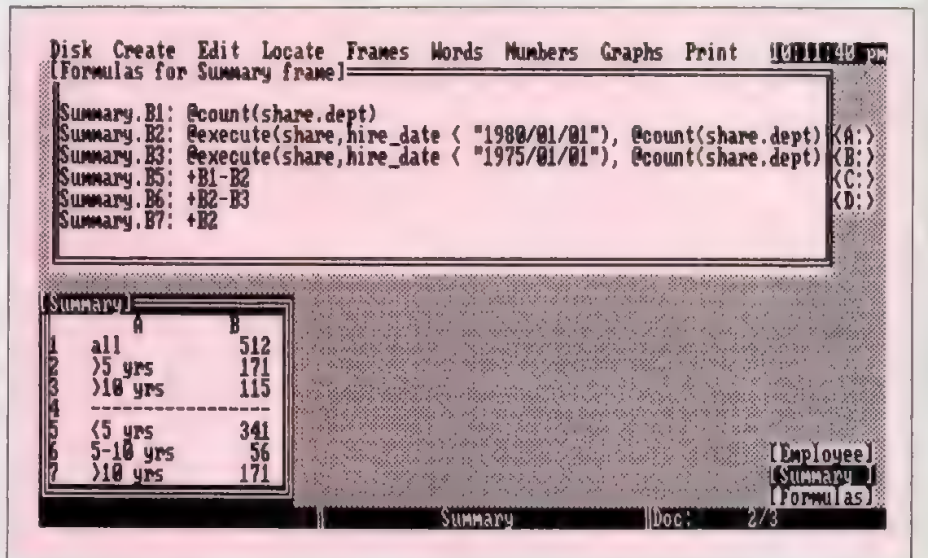


Figure F2: The new spreadsheet frame automates the calculation process.

employee records by hire dates. *Framework* makes this task difficult because it has no direct equivalent of 1-2-3's "data table" or "data distribution" functions.

The *Framework* filter function has one important characteristic. If I exclude records, I can't get back to them unless I invoke the Open command. That requirement means it's difficult to get back to the 5-to-10-year employees if I first had selected only the 0-to-5-year employees.

To do so, I had to count all the employees, select the 0-to-10-year employees and count them, select the 0-to-5-year employees and count them, compute the 5-to-10-year employees by subtracting 3 from 2, and compute the over-10-year employees by subtracting 2 from 1.

You can automate this process by creating a new spreadsheet frame called Summary (see Figure F2). The first three for-

(Continued on p. 303)

of employees in each category. @dcount counts the number of records in the database that satisfy certain criteria. To derive the first category, my criterion was @year(hire date)>=80, which instructs the @dcount function to tally employees whose year of employment was 1980 or later, meaning that they have been with the company less than 5 years. You can also use more sophisticated criteria, such as @year(hire date)>75#and#@year(hire date)<=80, which tallies the people who were hired after 1975 but prior to 1980—the middle group.

The SymFrame database included 512 records. As an ASCII file, it took up 24K of disk space. Converted into a *Symphony* file, it took up only 30K of RAM. Sorting these 512 records alphabetically by last name and first name took less than 15 seconds, a speed that 1-2-3 users would find consistent with their expectations.

Like *Framework*, *Symphony* retains the entire database in memory. This structure explains *Symphony*'s processing speed, but it also imposes constraints on the number of records that *Symphony* can store. On the other hand, *Symphony* is memory

efficient. On a 640K PC *Framework* can handle little more than the 512 records of the SymFrame database. Yet *Symphony* can store more than 4,000 records.

Symphony's extra capacity makes a big difference in many database applications. To perform sorts and derive summary statistics, you want one database, not sever-

Symphony has the power of integration, but loses the simplicity of integration in the twists and turns of a complex project.

al. Otherwise, you would have to process each database separately every time you wanted to sort, tally, or otherwise manipulate the file.

Suppose, for instance, that SymFrame had 1,000 employees. *Framework* would

be unable to manage a database of this many employees in one piece. *Symphony* could; its extra capacity does the job.

Several Criticisms

To generate the pie chart, I created a separate Graph window in a corner of the screen that took its underlying data directly from the spreadsheet's @dcount formulas. Changing the database by adding or deleting records would automatically update the spreadsheet and the graph.

Generating the graph showed several drawbacks of *Symphony*. Like other *Symphony* environments, Graph has its own menu of commands. Another menu, called Services, includes commands available in all environments. The Services menu invokes such functions as printing, filing, and windowing—procedures you might do in any of the environments.

Each environment also includes a settings sheet in addition to the two sets of menus. A settings sheet is a group of options that allow you to exert some control over the way *Symphony* performs certain functions in an environment. In a Graph window the settings sheet contains the information that *Symphony* uses to create a graph on the screen, such as the graph type (bar, line, and so on), titles, axis-scaling instructions, and the address of the range of cells to be graphed.

All these menus and settings get you only as far as the screen version of the graph. To get a hard copy, you must save the graph image, exit the program, and run the PrintGraph utility (which is on a separate disk). Thus integrating a graph into an application makes the task significantly more complex. The problem is not so much the difficulty as the disconcerting feeling of complexity you get when going from menu to menu to settings sheet to PrintGraph. *Symphony* has the power of integration, but the simplicity of integration gets lost in the twists and turns a complex project like this one takes.

On the plus side, *Symphony*'s graphics output is excellent. Figure S3 shows the

(Continued on p. 304)

SymFrame Software, Inc.
Employee length of service

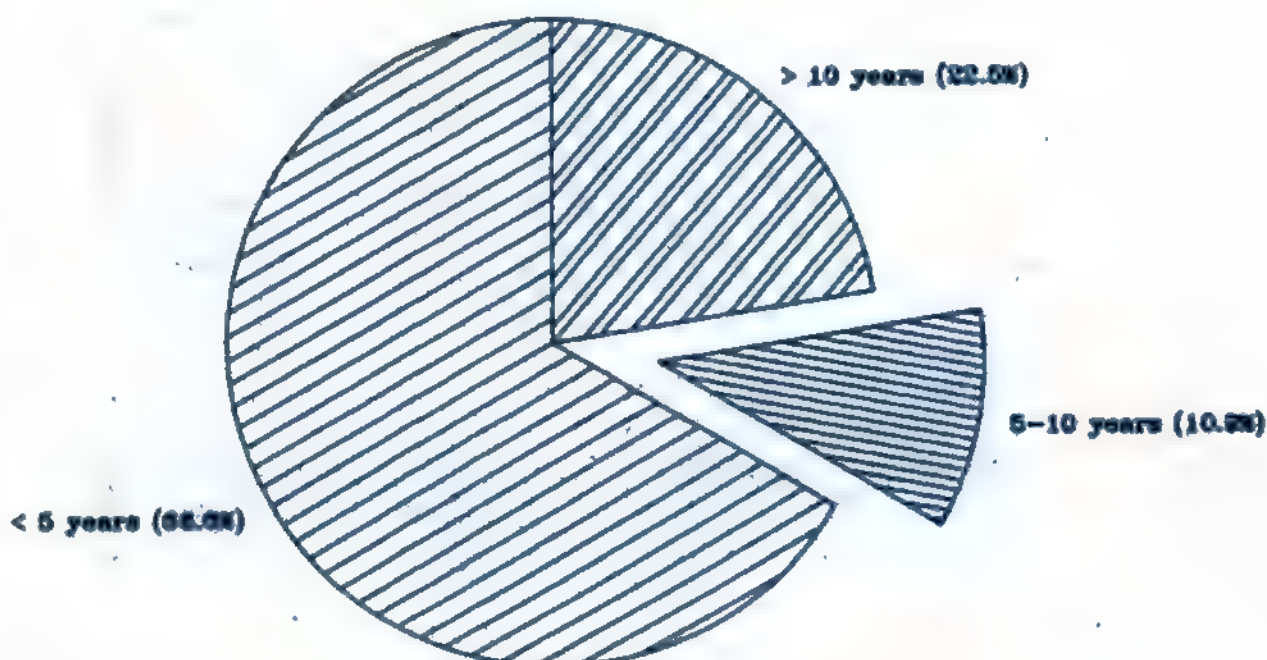


Figure S3: The pie chart generated by *Symphony* using one of the 11 available titling fonts.

● FRAMEWORK

mulas in Column B operate directly on the Employee database. The second three formulas reference the first three as in the process above. The interaction between the Summary and Employee databases is a good example of *Framework's* interframe linkage.

To include an employee service distribution chart in the memo to the company president, I first created an empty frame called Memo. Within that frame, I established a text frame called Text1 and then wrote the first part of the memo.

To make the chart, I returned to the Summary frame, selected the data to be graphed, and used pull-down menus to specify a pie chart (shown in Figure F3). I then told *Framework* I wanted the pie chart in the Memo frame. When the pie chart appeared where I wanted it, I concluded the memo with another subframe, Text2. Figure F4 shows the memo as it appeared on the screen, and Figure F5 shows the printout done on an Epson RX-80 graphics printer. Everything on the pie chart is "standard" except the employee counts that appear next to the slices. Adding in these counts was not difficult.

If I save the Memo and Summary frames on disk, I can create similar memos based on updates to the employee file by changing some Summary formulas.

Form Letters

At SymFrame Software, it's always been the custom to send congratulatory letters to employees as they approach their tenth anniversaries. *Framework* automates this task easily. It has a special form letter function that isn't really an integral part of *Framework* but rather an "application program" written in *Framework's* internal language, FRED.

I started with the Employee database as before, but instead of applying a filter criterion from an external spreadsheet, I applied the filter directly to the database as shown in Figure F6. The filter formula appears at the bottom of the screen, and the selected records appear at the top.

Although it's possible to trigger form

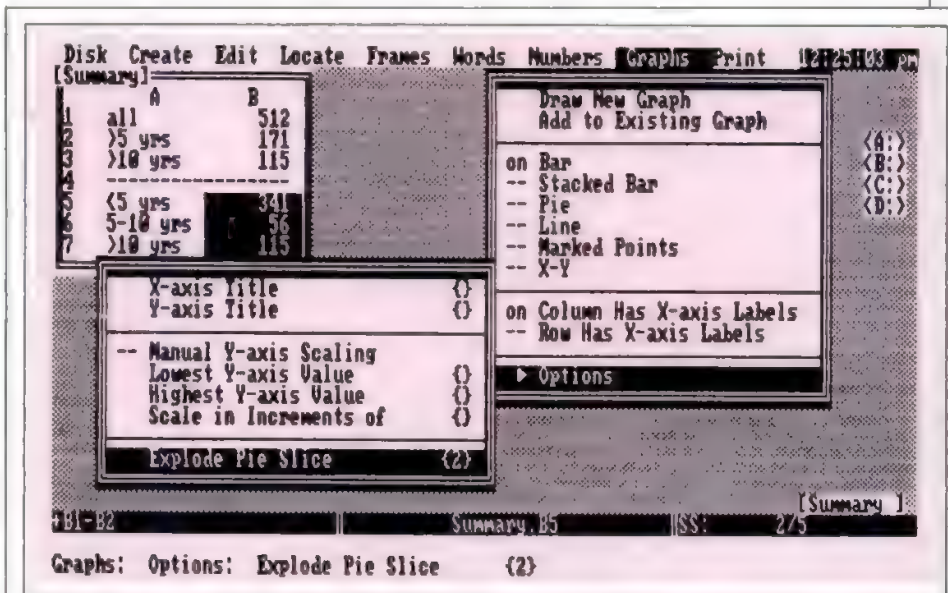


Figure F3: Framework's pull-down menu specifying a pie chart.

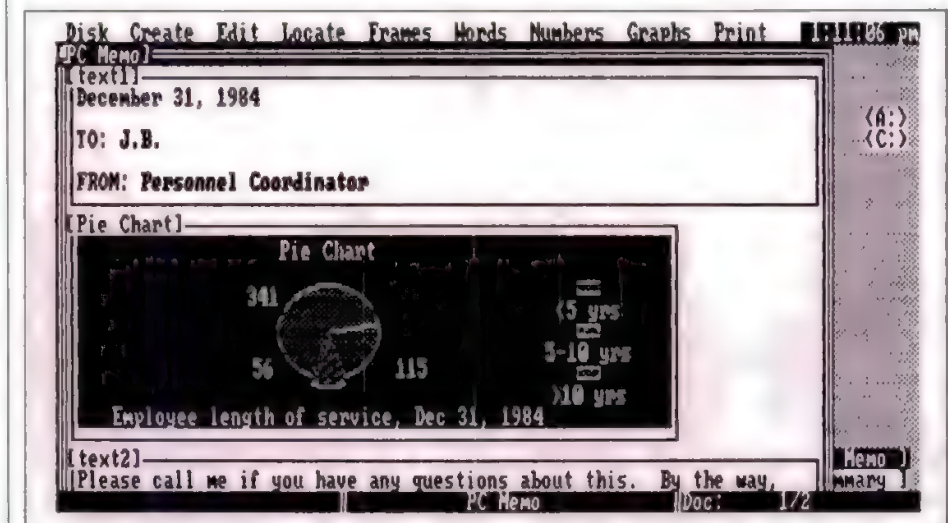


Figure F4: The complete memo as it appears on Framework's screen.

letters directly from this filtered database, since I had to fiddle with the hire dates, I found it more convenient to copy the data into a new "master" frame that contained the text of the letter. With a few keystrokes, I selected the field names and data from the Employee frame and then copied that data into an empty frame called Database within the Mailmerge frame.

Unfortunately, the dates were not in the right form. I had to add 10 years and convert to a standard format in which the

month was spelled out. I then added a new temporary field and defined the following formula:

```
temp :=
  @date4(@date(@value(
    @mid(hire_date,1,4))+10,
    @value(@mid(
      hire_date,6,2)),
    @value(@mid(
      hire_date,9,2))))
```

(Continued on p. 305)

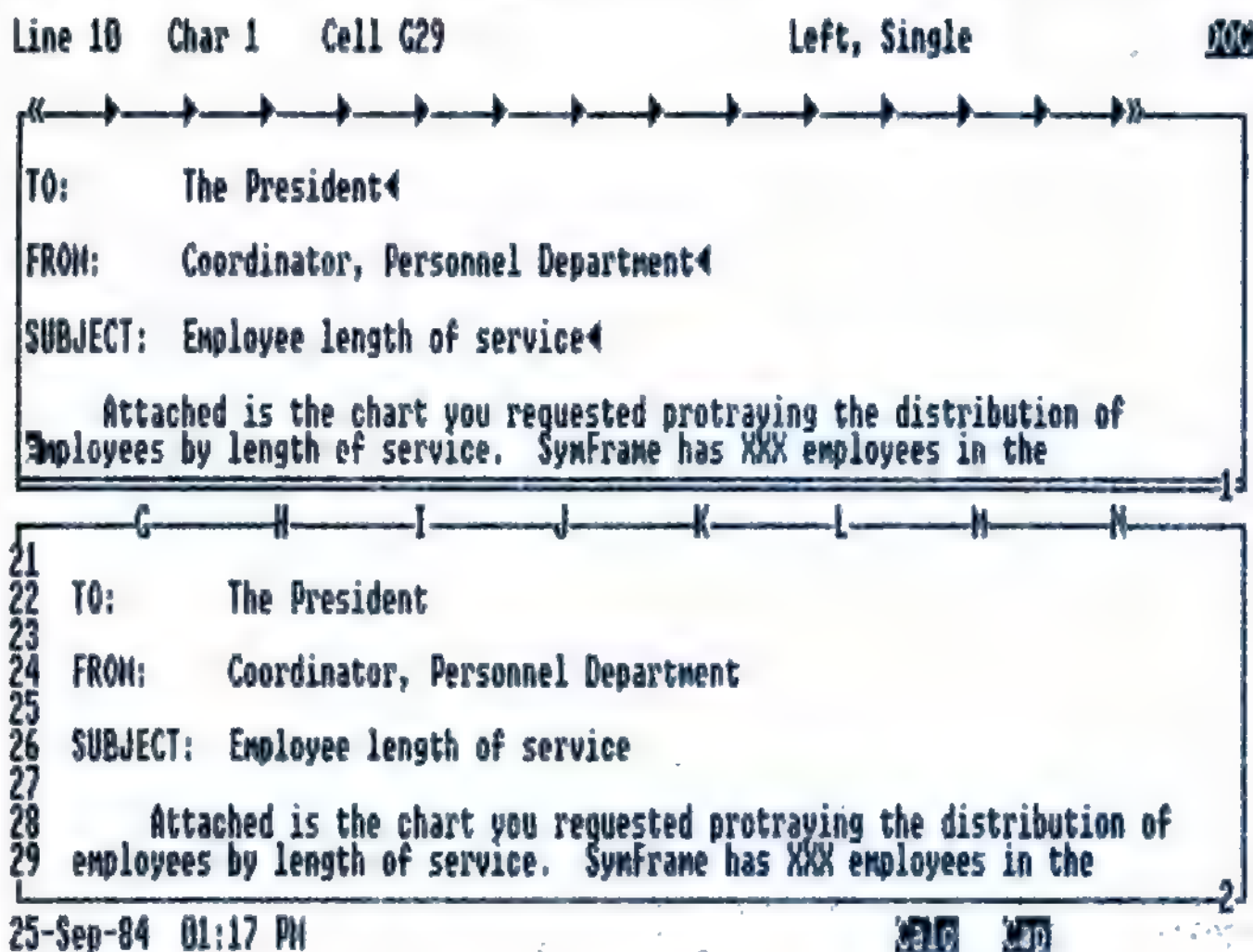


Figure S4: The same information shown in two different ways: using the Doc environment (top) and as a column of spreadsheet label cells (bottom).

pie chart generated on an Epson FX-100 dot matrix printer. *Symphony* gives you a choice of 11 fonts for titling and labeling. This graphics system is designed for professional presentations.

But integrating graphics and text in hard copy is another story. You can display them simultaneously on the screen, but you can't print them together. I had to generate and submit my pie chart and the related memo on separate pages. The quality of the output is good, but I miss the appeal of a truly integrated printout.

Don't get the impression that *Symphony* is, in general, complicated to use. Taken separately, each working environment is both easy to learn and easy to use. The word processor is a good example.

You can begin a document by working in a Doc window. In this environment, you don't have to invoke any special commands or menus to begin working. You simply start to type. The word-wrap function is automatic, and you can use the cursor keys to move around the document to

make corrections or insertions.

When you have a special task to do, such as copying or moving text, invoke the Doc command menu and select a com-

You can display graphics and text simultaneously on the screen, but you can't print them together.

mand by moving the cursor over the desired command and pressing Return or by typing the first letter of the command. This simplicity helped me teach the secretary the Doc environment in minutes.

Once you have completed the text of the memo, you can insert data from the spreadsheet into the document by revert-

ing to a Sheet window and placing formula references into the text. In the spreadsheet, the document is stored as a column of spreadsheet labels; each label contains one line of the memo. The top of Figure S4 shows the memo in the Doc environment, while the bottom displays the same information as a column of spreadsheet label cells. Both windows peer at the same area of data storage.

The cursor is on a line where spreadsheet data will be inserted. I must replace the XXX by a reference to cell G1, in which I stored the @dcount formula. To insert this cell reference, I had to convert the label into a character-string formula in which the string equivalent of the @dcount result was sandwiched between the beginning and end of the text line. This conversion of a label to a string concatenation formula is accomplished in the spreadsheet's edit mode. It is not terribly difficult, but I would have expected Lotus to provide a more automated way of inserting formulas into text. Converting a formula result to a character string can be tricky, especially with a date.

The resulting memo is tightly integrated into the spreadsheet and database. When the underlying data change, *Symphony* automatically recalculates the @dcount formula in both the spreadsheet and the memo, an advantage of storing everything in a single database.

The Form Letter

I used a similar method to compose the congratulatory form letter to employees whose tenth anniversary is approaching. I created the text using cell references to the field names of the database, such as Last Name and First Name. When I issued the Print command using the Database option, *Symphony* looped through each selected record in the database, substituted the formula values for that record, and printed the letters.

The Print command is sensitive to any selection criteria or sorting that you might have activated in the database environ-

(Continued on p. 306)

● FRAMEWORK

You don't have to fully understand this formula to see what it's doing. @date4 and @date are *Framework* date conversion functions, the @value function converts a string to a number, and the @mid function extracts characters from a string. Any formula can be defined for a field name. That formula will then apply to all occurrences of the field within the database. Figure F7 shows the Mailmerge frame with the new, short database shifted leftward in order to show the temporary field's contents.

Figure F7 also shows the text of the letter. When the letter is printed, once for each database record, the corresponding fields will be inserted in place of the field names shown in angle brackets. To run the form letters, all I have to do is to load the MAILUTIL program, which is stored in a frame, and then execute it with the recalculate key.

Linked Spreadsheets

SymFrame's Idaho, Iceland, and Lichtenstein division managers are responsible for preparing their own income statements, in United States dollars. Each manager has a PC with a copy of *Framework* and a standard template frame for that division's quarterly income and expenses. The frames are sent to headquarters via *Framework*'s telecommunications utility.

The president likes to see company-wide statement summaries. One shows the consolidated quarterly income and expense, and the other shows the individual yearly income and expense for each of the three divisions. To produce the summaries, I first loaded all three divisional frames onto the screen. Next, I made a template for the consolidated report by copying one of the divisional spreadsheets and erasing the numbers. Then I typed the following formula into cell B6:

```
+ idaho.B6 + iceland.B6
+ lichtenstein.B6
```

All I needed to do was copy this cell to the rest of the sheet and delete the formulas from the lines that should be blank. The

Framework cell copy function changed the cell references as necessary. The formula in B7, for instance, automatically came out as

```
+ idaho.B7 + iceland.B7
+ lichtenstein.B7
```

This scheme assumes that each divisional spreadsheet's layout is exactly the same. If they had not been, I would have had to manually adjust each formula in the summary sheet.

Producing the individual yearly income statement was only slightly more involved. I rearranged the sheet a little, replacing the four quarterly columns with three divisional columns. Now the top row

of formulas reads as follows:

```
B
+idaho.$F6
C
+iceland.$F6
D
+lichtenstein.$F6
E
+B6+C6+D6
```

The dollar signs indicate that F is an absolute reference to the divisional total columns, whereas the row numbers are relative references that change as the formula is copied. I copied this row of formulas down the sheet, erased the rows that

(Continued on p. 307)

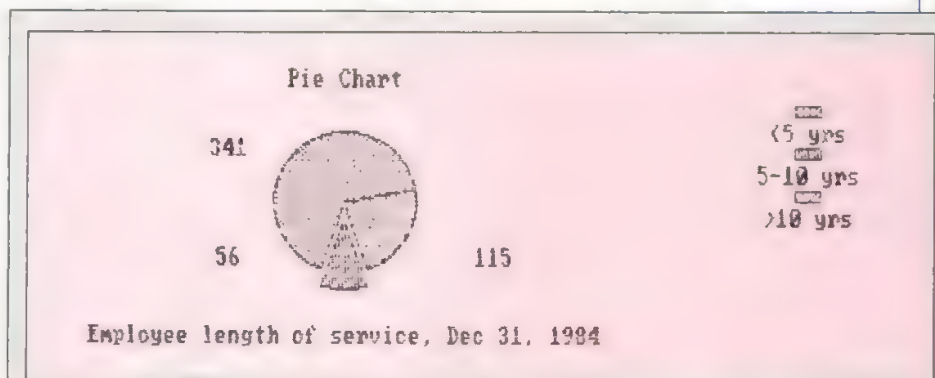


Figure F5: The final printout on a Framework-supported dot matrix printer.

Disk Create Edit Locate Frames Words Numbers Graphs Print						10/24/84 11:00
[Employee]						
LASTNAME	FIRSTNAME	DEPT	SALARY	HIRE_DATE		
HAWKINS	MARTHA LOUISE	9	11000	1974/11/05	(A:)	
MATHER	MARK EDWARD	1	49000	1974/11/07	(B:)	
VARRELMAN	RUTH	4	19000	1974/11/12	(C:)	
					(D:)	
						[mailmerge]
						[Employee]
and(hire_date) >= "1974/11/01" Employee						[Char: 1/1 CAPS]
and(hire_date) < "1974/11/04",hire_date < "1974/11/18")						
Formula/number editing; RETURN finishes						

Figure F6: Applying a filter directly to the Framework database.

ment. Once I created the form letter, all I had to do was to enter a Form window, issue the criterion, and invoke the Print command. The criterion to select employees whose tenth anniversary fell between November 4, 1984 and November 17, 1984 was `hire date >= @date(74,11,4) #and# hire date <= @date(74,11,17)`. *Symphony* conveniently allows you to either use or ignore selection criteria, so that I could elect to send form letters to all employees or to an exclusive group of employees.

The short documents of the SymFrame example do not put *Symphony* through all its word processing paces. *Symphony* does not have an outlining feature, which greatly enhances project organization, particularly writing projects.

However, *Symphony* offers a capacity advantage in word processing as it does in other environments. *Symphony's* ability to store more pages of text means you can use the search-and-replace function on more text at one time. If you have a long document, such as the chapter of a book, and you need to replace one word with another every place it appears, it is more convenient to do the operation only once when the entire text is in one file.

Symphony's ability to consolidate separate spreadsheets is easy to use, but limited. To obtain the first consolidated statement (total company revenue and expenses by quarter), I used *Symphony's* File Combine Add command. Assuming that the files to be added are in the same format, the three files can be combined into a single worksheet with three simple commands:

```
/File Retrieve IDAHO
/File Combine Add LICHTENS
/File Combine Add ICELAND
```

The result is a single spreadsheet containing the sums of the three divisional statements. Notice that this method did not require a single formula. *Symphony* does all the addition automatically.

The second consolidation is a statement

of full-year revenues and expenses broken down by division. The first statement took values from the component spreadsheets and combined them in the same relative positions as in the consolidated statements, but in this task the consolidated divisional data must be rearranged.

Although *Symphony's* spreadsheet has few shortcomings, referencing cells in other files is one of them. You cannot write a formula in one spreadsheet that refers to a cell in a separate spreadsheet.

Symphony is for
number crunchers
and also for
many word-
workers. And
learning to use
any single piece
of Symphony is
within anyone's
grasp. But it's
not for everyone.

Nonetheless, I was able to do it by using a different form of the File command: File Combine Copy. The Copy option incorporates all or part of a separate spreadsheet into the current spreadsheet. *Symphony* allows you to assign names to cell ranges and to use these range names instead of cell addresses in commands that require range specifications.

Retrieving Ranges

The File Combine Copy command allows you to retrieve a named range of another file. By assigning range names to the full-year columns of the three divisional files, I could use the File Combine command to create the divisional columns in the consolidated statement. I gathered the

values of the subsidiary spreadsheets into my work area, rather than create formulas that refer to specific cells within those spreadsheets. Therefore, if I changed a number in one of the underlying spreadsheets, the consolidated file would not reflect the change automatically.

A third method of consolidation allows perfect linking of the divisional and consolidated data. I used the File Combine Copy command to load the three divisional statements, one after the other, in a single spreadsheet. Then, I created formulas to pull down values from the three statements into a fourth, consolidated section of the spreadsheet. Making a change to any number on this spreadsheet updates the consolidated statement automatically. By using separate windows for each spreadsheet, I could manage the project quite handily.

Symphony's ability to pack several spreadsheets into a single work space is a convenience for this application, but in certain instances, it's a necessity. If you use spreadsheets that require many rows or many columns, you may not want to divide the information into frames.

A Last Word

Symphony is for number crunchers, but it's also the package for many word-workers. And learning to use any single piece of *Symphony* is within anyone's grasp.

But is *Symphony* for everyone? Absolutely not. *Symphony* becomes more difficult to learn and use in applications that require a combination of tasks. The novice who tries to do too much at once will become discouraged. The variety of commands, features, environments, and settings confront you with a steep learning curve. The menu structure that works with such intuitive simplicity in 1-2-3 becomes unwieldy when you are dealing with such a complex program.

For the "power user," however, *Symphony* makes up in capability and sophistication what it lacks in design simplicity. If the price of higher performance is a little more complexity, I'll pay it! ■

● FRAMEWORK

should be blank, and I was done.

The *Framework* summary spreadsheets are linked to the divisional sheets. If the numbers in the divisional sheets change, the summary sheets will reflect those changes when recalculated. Since all the sheets are in memory at once, recalculation is almost instantaneous. It's also possible to copy cells from one sheet to another. If the cells contain text or numbers, there's no problem, but if they contain formulas, those formulas might not make sense when they arrive at the destination sheet. In *Framework*, it's hard to convert a formula to its resulting value.

All the SymFrame example spreadsheets can be conveniently stored in one master frame called SymFrame. The left side of Figure F8 shows that frame displayed in *Framework*'s outline mode. When I need to see a particular spreadsheet, I just move the cursor bar down the frame's name and use a function key to bring up the spreadsheet in full-screen "zoom" mode. You can easily attach sequential numbers to outline items; the right side of Figure F8 shows the results. This ability is the basis for *Framework*'s outlining; you can see how organizing a project is equivalent to writing a document from an outline. You just substitute text for the spreadsheets.

Limitations

Framework has some severe memory limitations. The 512 SymFrame records nearly fill up a 640K RAM system. In both *Symphony* and *Framework*, an entire database must fit entirely within memory; this requirement limits these products' usefulness. Conventional database management packages that store data records on disk have an almost unlimited capacity.

Framework's problem is that its memory storage is inefficient. The employee database in *Framework* occupies about 250K, but requires only 24K when written to disk in ASCII form. *Framework* does interface well with *dBASE II* and *III*—you can even select particular fields and records from them. If you have a large

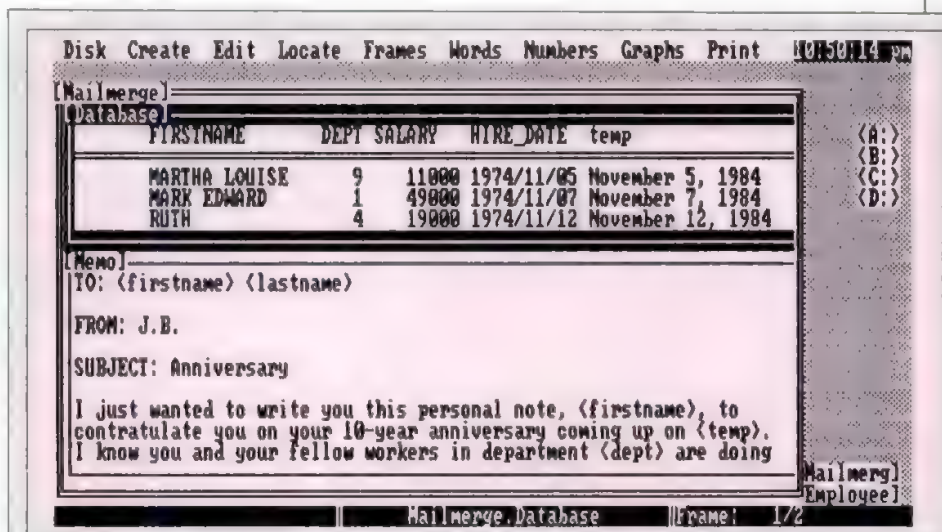


Figure F7: The Mailmerge frame combined with the new, short database.

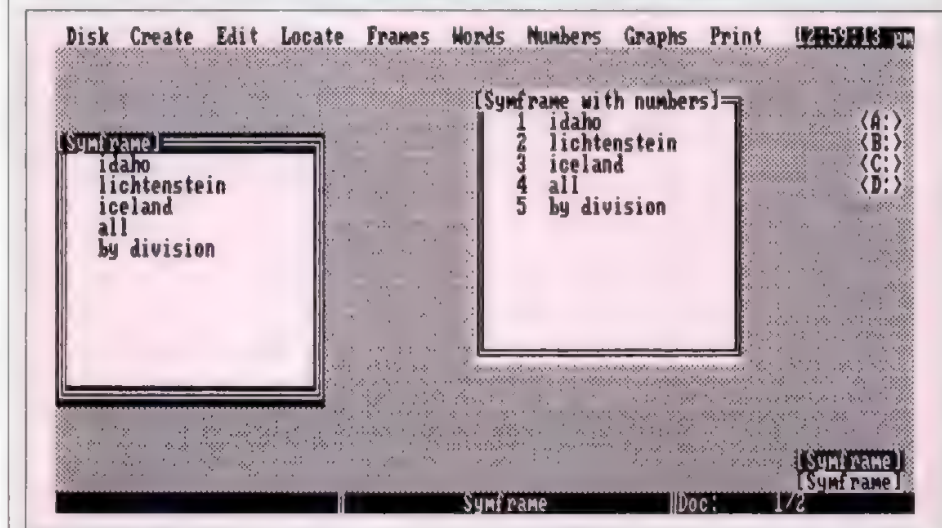


Figure F8: Use *Framework*'s outline mode to append sequential numbers to outline items.

database, consider storing it in *dBASE II* or *III* for later extraction into *Framework* as required.

Lotus Development's products have long been known for their quick spreadsheet recalculation. *Framework* doesn't do as well, but if you add an 8087 math coprocessor chip, *Framework* will automatically make use of it, bringing the row-by-row recalculation speed dead even with 1-2-3's—under 30 seconds for anything you can fit in *Framework*'s memory space. Here's something else to consider: 1-2-3 and *Symphony* force you to model

your problem on one large sheet, and you must recalculate that whole sheet as a unit. With *Framework*, your problems are broken down into frames, and you can choose which frames to recalculate.

Last Thoughts

Framework has an edge over *Symphony* in ease of use and elegance of design. It's not just for "power users" either, because office staff people have used it successfully. I think it will be a very successful product, and that, like *dBASE II*, it will be improved by Ashton-Tate. ■



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Bobby T. Bunches - L.A.

RE: Shampoo Sales, 4th Quarter Trends

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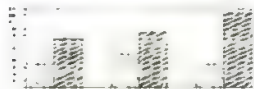
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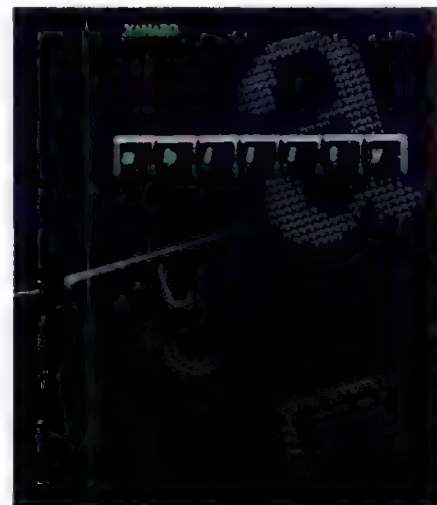
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Hayes Microcomputer Products put a few surprises up the sleeve of its new list manager, *PLEASE*, including a variety of output plans, up to nine screens per file, and three password levels.

It's commonly known that Hayes Microcomputer Products set the standard for modem protocols and associated communications software. So it's only natural that I assumed Hayes's first database management system would be closely tied in with the company's current success and position in the communications marketplace. However, instead of a sophisticated, communications-linked database management system, I found a straightforward, full-featured list manager, with most of the capabilities a novice user expects to find in a file manager, plus some surprising additional features.

PLEASE is a list manager that enables you to create, maintain, and output from

flat files. Although you can't relate multiple files, you can create one file from another. Moreover, *PLEASE* is virtually bug-free, a distinction that can't be fully appreciated until you have worked with other systems that seem to have a bug lurking around every carriage return. *PLEASE* has only been on the market since May, so the cleanliness of the code is a testament to Hayes's development staff as well as to the company's thorough quality control.

PLEASE, primarily a menu-driven system, relies heavily on the use of function keys. For example, the F10 help key is always available to aid you. Even when you are asked to type in a field name, the system immediately checks

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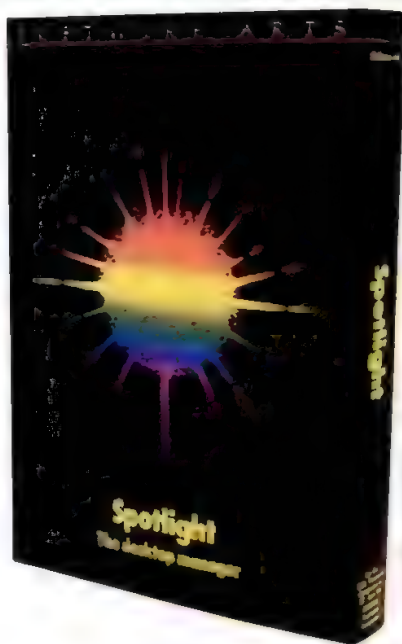
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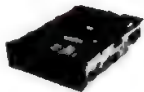
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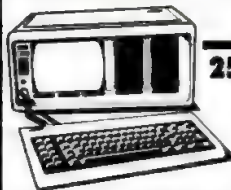
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PLEASE

for correct spelling and provides another help key to refresh your memory on the names of the fields in the file. In the more complex portions of planning reports,

which *PLEASE* calls Output Plans, you refer to fields by their numerical order in the file, rather than by field names.

Installation of *PLEASE* from the DOS

level is rather slow, especially if you are running from a floppy disk. On a floppy system, it takes 27 seconds to get past the copyright screen to the main menu. And on an XT, where I did all my testing, it takes 22 seconds. I found that by hitting the carriage return as soon as the copyright screen begins to appear, I was able to cut about 10 seconds from the total time. However, this technique is not documented.

A straightforward, menu-driven process helps you create new files. Once you are in the File Creation mode, the F3 key initiates the declaration of a new field. Field names can have up to 20 characters, but you will probably want to keep them short for two reasons. First, whenever you are prompted for a field name while using *PLEASE*, you are not allowed to use abbreviations. In other words, each time you use a field name, you must correctly type the entire name. Second, *PLEASE*'s Quick List capability uses field names for column headers, so if the names are longer than the field length itself, the number of columns will be reduced. *PLEASE* folds lines if there are too many columns for the width of the page or screen, but this takes away from the appearance of the Quick List output.

PLEASE offers four types of fields. Character fields contain up to 999 characters—a surprisingly high limit for this type of file manager. Numeric fields include up to 15 digits, with a maximum of 9 decimal places. Boolean fields (or Indicator fields, as they are called in *PLEASE*) are always one position, and a Date field holds six positions.



PLEASE

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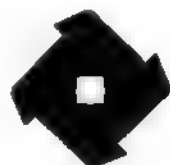
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PLEASE handles dates in a very user-oriented fashion. When you enter dates, you type them in MMDDYY format. But as soon as you hit Enter, the format on the screen changes to MM/DD/YY, which is how it continues to be displayed on retrieval screens and in reports. Dates are also stored in an internal format so they sort correctly, as if they were in

Character fields contain up to 999 characters—a startlingly high limit.

YYMMDD format. Consequently, you get the best of both worlds.

Each field can have a default value, low and high values for checking validity, and three forms of protection: requiring you to enter data, preventing you from entering data, and making data entry optional. A useful feature is the ability to specify Today as a default value for a date field; *PLEASE* then automatically takes the system date and plugs it into the field for you. However, *PLEASE* does not provide you with any capability for checking a list of specific acceptable values for a field; it only allows you to check on the range of each list. For example, in a personnel database, you can only check on how many departments there are in a division but not on specific departments such as payroll, accounting, or personnel.

The first field that you declare in the creation of a new database is the key field. Every file has only one key field, which is indexed and, if chosen correctly, can provide some benefits. As a default, *PLEASE* allows records with duplicate key fields in the file. However, if the application is a personnel file for a company, perhaps the key field should be Social Security Number. In this case, *PLEASE* gives you the option of preventing duplicate key fields.

An indexed key field also helps with data retrieval. For example, using a test field of 500 records of 100 characters each, I initially scanned for a record that

was third from the end by employing a nonkey six-digit employee number. The search took 45 seconds to find the appropriate employee. I then created a second

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PLEASE

database with the employee number as the key field, used the *PLEASE* Copy utility to move the data from the first file to the second, and performed the search again. The time was cut down to 21 seconds. While the use of the index speeds up the search, I wouldn't want to have a file with many more than 500 records, even though

You can replace the
default screen and
provide a
customized data
input environment.

PLEASE will allow up to 16 million records, depending on the key field value and key field length. Unlike some programs that can instantly locate a file, *PLEASE* searches the index sequentially as it displays the key words in the information field on the screen—a time-consuming process.

Password, Please?

Another *PLEASE* feature allows you to declare three passwords per file, which permit read only, read/write, and file structure modification. The level of passwording can be attached to standard routines, called Plans, to limit execution to appropriate personnel.

For data entry, the program creates a default screen when the file structure is defined; you can create a secondary screen to replace the default one and provide a more customized data input environment. *PLEASE* allows you up to nine screens per file, which is a great deal more than most file managers of this type.

PLEASE permits you to perform a calculation at the time of data entry, using other fields in the file. Once you're in the Data Entry mode, the calculation can be defined and executed by the use of function keys. However, the formula can't be saved from session to session, so you are forced to re-enter it every time. Only one

field can be defined and calculated at a time.

Strong Output Methods

PLEASE offers three methods of output, which is one of the program's strongest features. One method is the Scan capability, which is also used for data entry and field modification. Either the default file screen or the secondary screen is displayed. You can use function keys to move to the top or bottom of the file or move to the next or previous record. You can establish screening criteria for a field by using a relational operator, such as E for "equal to" or L for "less than." Once you've done this, your searches apply to only those records with indicated fields that match the screening criteria. Once again, I remind you that the screening works much faster on the key field than on other fields.

Another method of output is the Quick List, which is used to produce a very simple listing of data in the file in a columnar format, either on the screen, on the printer, or in a file. The creation of the Quick List is not menu driven, but *PLEASE* checks the validity of the entries. You can enter a title, screen on multiple fields simultaneously, sort on one field, and out-

put selected fields. *PLEASE* attempts to fit all the output fields within 80 columns but wraps the text around if it cannot. Even if you direct the output to a wide printer, it still wraps at 80 columns.

A lot of overhead is created when sorting with the Quick List. It took 14 seconds to begin printing a file of 14 records, with a sort field of 6 characters and data fields of 44 characters, but it took only 45 seconds to begin printing from my large test file of 500 records. That's fast for a moderate-size file, but slow for a small one. Moreover, I can't see any advantage to sorting on a key field as opposed to any other field in the file.

The third output method is the Output Plan, which has four variations. The List Output Plan allows you to produce a columnar listing of selected fields from a file. Options are double-spacing, column headings other than the field names, subtotal and total calculations, and minimum, maximum, and average functions.

The Form Output Plan places fields in exact positions on the page. This feature is used for printing on preprinted forms or mailing labels. You are allowed to specify an alignment mark to help you get the form lined up correctly in the printer. The precise placement of fields is designated

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Press 41 to continue...							

This screen from *PLEASE* depicts a payroll file called from the Name key field.

PLEASE

by both line and column numbers.

The Replacement Output Plan makes mass changes or deletions to your file. Using this type of plan, you can easily

recalculate a derived field in your file, set a field to a constant, or set a field to equal any other field in the file.

An Export Output Plan unloads data

from a *PLEASE* file and makes it available to other software programs. This plan provides a great deal of flexibility in delimiting fields, placing quotes around fields, and truncating trailing blanks. Output can be in either DIF format for exporting to spreadsheets or ASCII format for exporting to databases such as *dBASE II*, to word processors, or to BASIC programs. Importing data to *PLEASE* is done in a similar fashion, with one troublesome limitation—the order of the fields and their length must correspond to the internal file structure.

The Output Plan Mode

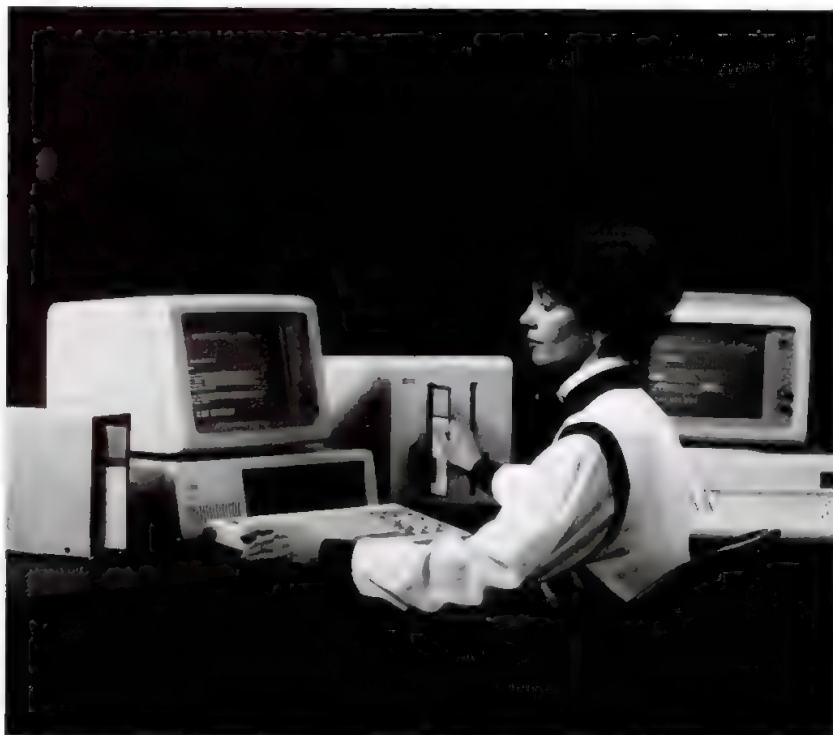
Unlike Quick Lists, Output Plans can be saved for later use or for execution by other individuals. You can supply a title with each plan to identify its use, and you can also specify a desired form length and width. Levels of passwording can be embedded in each plan so that only those with the proper password can execute it.

The ability to define new fields is extensive in the Output Plan mode. Any of the four arithmetic operators are allowable, in addition to the average function. Defined fields can be established and can even be used in the definition of additional defined fields. They can be used for screening or sorting, just as if they existed in the original file.

Record selection in Output Plans allows you to screen on multiple "if . . . and . . . or" conditions simultaneously, which permits very complex screening conditions. For instance, you could specify: All products with sales greater than 5,000 or products with a gross margin greater than 43 percent or products that come in blue and were introduced in 1983. While this is not the wording you would use for reporting your screening conditions—*PLEASE* provides a formatted screen with fill-in blanks—it gives you an idea of the complexity allowed.

When specifying fields to use in Output Plans, you must refer to them by field numbers rather than by names. This can be an advantage if your fields have long

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PLEASE

names, but it's a disadvantage if, like most of us, you have trouble remembering the numbers of your fields. However, you could construct a crib sheet with the names

and their corresponding numbers.

Column headings other than the field names can be provided in the List Output Plan; these headings can be up to 20 char-

acters long and can include blanks. Headings must all be on one line.

PLEASE will calculate three levels of subtotals as well as column totals. Unfortunately, the subtotals and column totals do not print in the proper data column; *PLEASE* prints subtotals to the side, so the report is difficult to read.

When you create a *PLEASE* file, you naturally want to do it right the first time. However, if you change your mind about the number of fields in the file or their sizes, *PLEASE* makes provisions for changing file definitions. Some file-level definitions, including file description, passwords, and the duplicate key option, can be changed even though data exist in the file.

Changes to fields cannot be made to an existing data file. Instead, you must copy the file structure, modify it, and then copy the data from the original file to the new file. *PLEASE* has utilities to help you do this, but this is still a tedious process.

PLEASE's dial feature provides the only tie-in with communications in the program; it automatically dials a telephone number in a record with the aid of a Hayes or other compatible modem. This would be convenient for use with a list of sales prospects or overdue receivables.

Documentation

PLEASE provides outstanding, easy-to-understand documentation. Each chapter covers a primary feature of *PLEASE* and is tabbed for easy reference. The manual also includes a table of contents, index, appendix, and glossary. Each chapter begins with a small glossary of new terms in the chapter and ends with a summary.

To get you started, *PLEASE* includes a separate booklet entitled "Ready, Set, Go! Please," which instructs you on how to install *PLEASE* and walks you through the creation and use of a simple file. By the time I read all 18 pages, I had a good feel for *PLEASE*.

The manual is not your usual dry, IBM-type manual but offers instruction by



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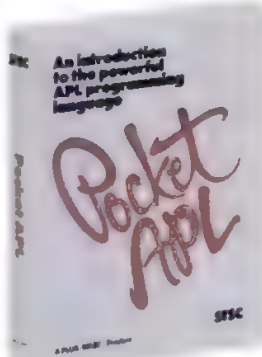
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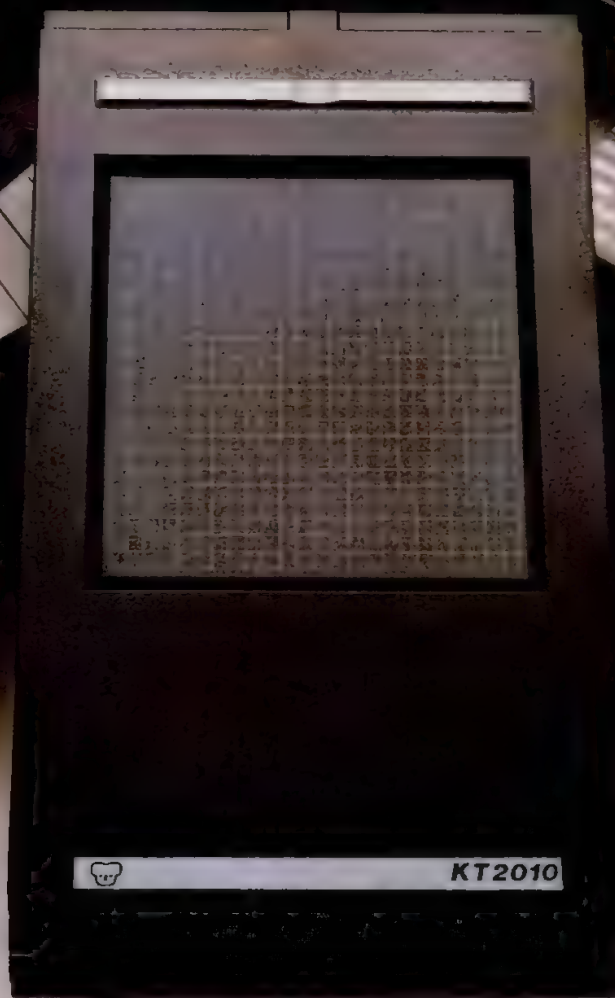
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d to call the
for help with
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the time I called, no
but a representative
back in 5 minutes. This was
because there is no 800 toll-free
number and the conversation took about
20 minutes.

By their own admission, the support people hadn't received many calls about *PLEASE*—perhaps because it was new at the time and not many copies had been sold yet. Many of the questions I asked had to be referred to other people in the background, and a few of the answers I received about the availability of features were misleading. Generally, however, the support staff was helpful and eager to assist.

The physical requirements for *PLEASE* are a minimum of 128K RAM and two floppies or an XT with a hard disk and one floppy. I tested *PLEASE* with an XT with 640K and a monochrome monitor. The manual indicates that some prompts and help lines are in color. Subdirectories in DOS 2.0 are not supported. *PLEASE* can handle up to 16 million records per database, depending on the key field value and the key field length; 99 fields per record; 999 characters per field; and 2,000 characters per record.

Overall, I think the strong points of *PLEASE* are the variety and extent of its Output Plans, the ability to have input with up to nine screens, the three levels of file passwording, and the clear, professional documentation. Its ability to dial a phone is a unique capability that can be very useful in a number of applications.

PLEASE's drawbacks include the weak indexing feature using the key field, the lack of alignment of subtotals and totals in the List Output Plans, and the program's

inability to update a field in a file automatically. In addition, *PLEASE* requires you to reestablish the calculation for a field every time you enter the Add/Change

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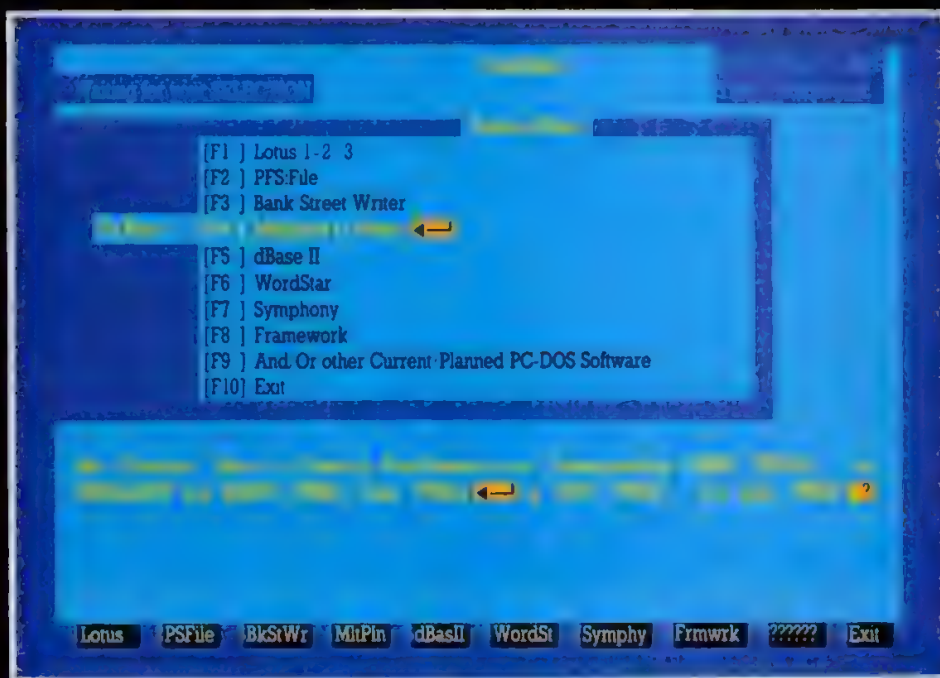
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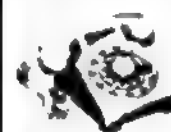
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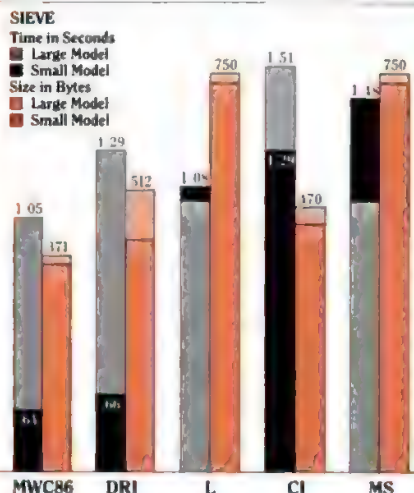
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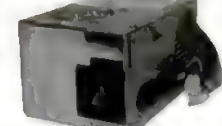


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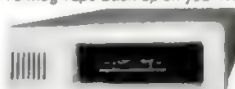


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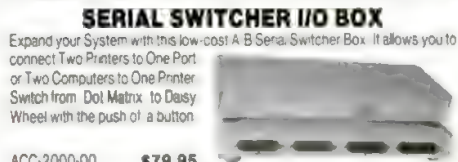
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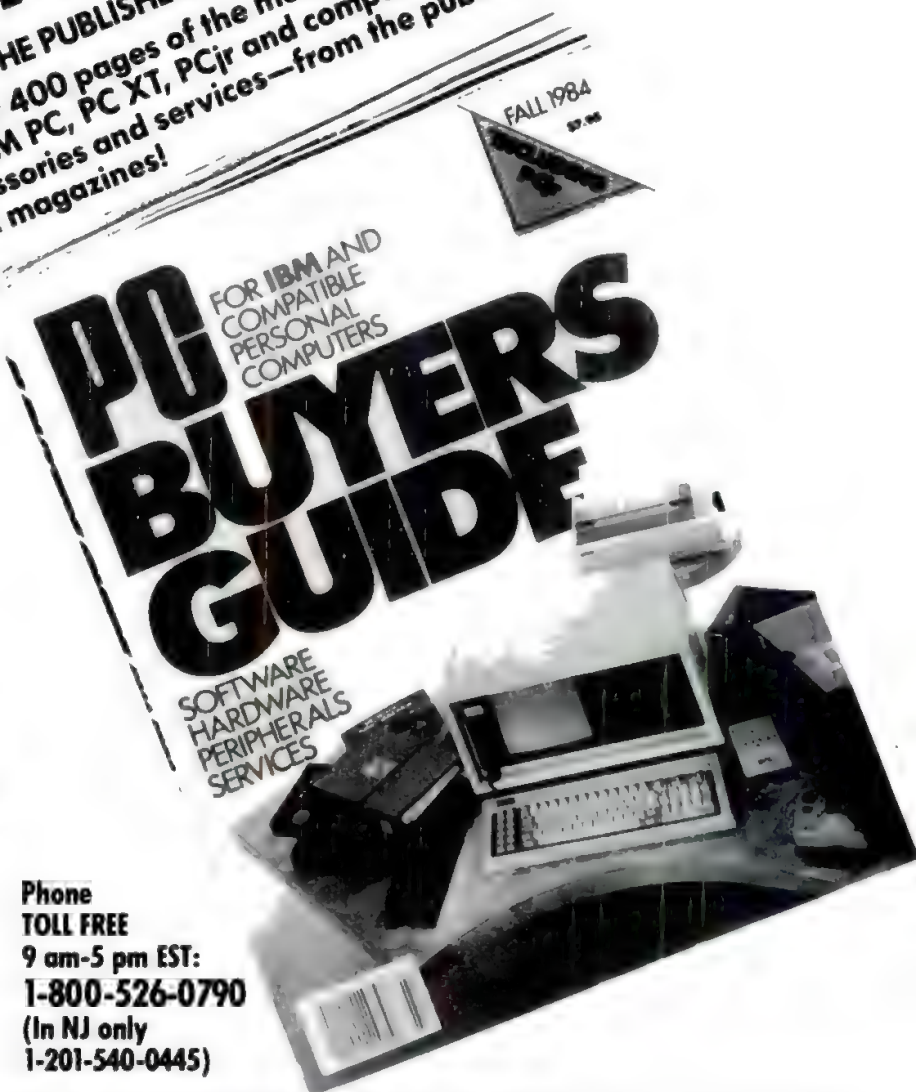
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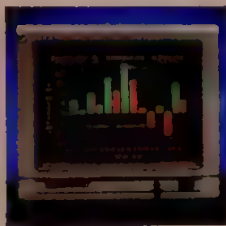
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Textra:

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Ann Arbor Software's easy-to-use program, *Textra*, economically meets most word processing needs.

T*extra* is a recent entrant to the growing field of powerful, low-cost text processing programs that have emerged in the last 2 years. Designed by Ann Arbor Software for first-time users, *Textra* features basic word processing functions and a low price tag (\$95). In many respects it rivals word processing programs costing hundreds of dollars more. Although it has none of the extras you would expect in a more-expensive text processing software, such as mail-merge or a spelling checker, it does provide an economical way of meeting most word processing needs.

Different Strokes

Textra is easy to use. It loads quickly and presents you with the initial screen: a directory of the logged disk drive (with files displayed by number); the copyright statement; and two menu choices, "Changed logged drive" or "Exit to DOS." Loading the file you want to edit is easier with *Textra* than with any other text processor I've used lately—all you do is type in the number corresponding to the file. You can still load a file by name if you choose, but using the file numbers is easier and more convenient.

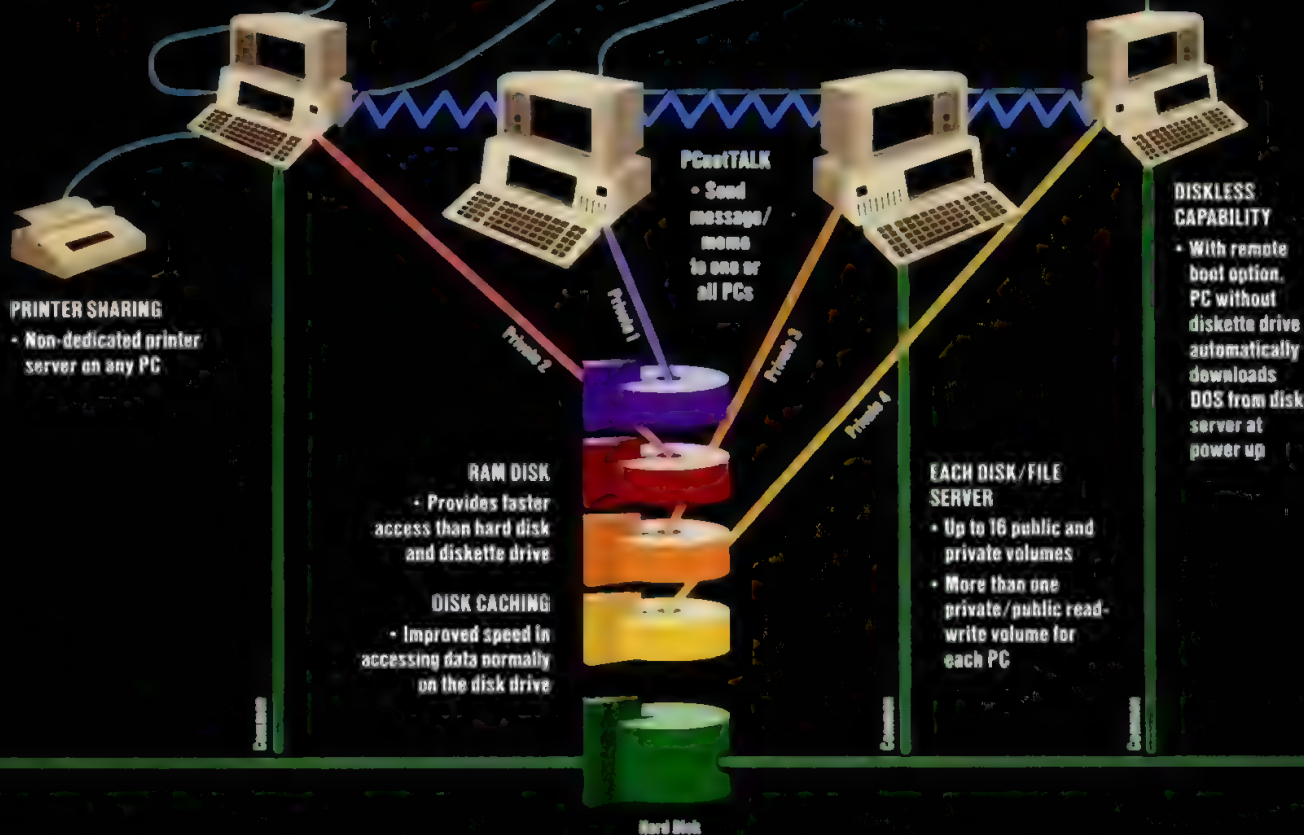
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Saving a file is somewhat more complicated, but not much. When you're finished with an editing session, you hit the F1 key to change from the edit menu to the main menu, and then you simply make your selection by pressing the appropriate function key. The main menu includes options to abandon the session, save with the program's internal settings implemented or turned off, abandon the edit and load a new document, relog the default disk drive, save with the same filename, save with a new filename, save the file and return to the editor, or simply return to the editor.

Everything in *Textra* is keyed to the editor, which forms the core of the program. For instance, instead of showing the main menu at the bottom of the screen, *Textra* presents you with the editing menu and you must toggle back to the main menu. This takes some getting used to, but you'll probably be using the editing options more, so it makes sense to do it this way.

It also takes a short time to get accustomed to the number of choices available for saving a file, but after learning them thoroughly you can be very comfortable with them.

Textra's modes for inserting and deleting text are pretty complicated. The program gives you three insert modes and six delete modes; the delete modes make heavy use of the function keys.

Textra is almost always in the insert, rather than the overstrike, mode. This means that if you enter text in the middle of a sentence, all the text to the right moves over. I'm used to programs, such

as *MultiMate*, that operate in an overstrike mode, with insert being toggled on and off as needed. With *Textra*, you toggle overstrike on with the Ins key, and overstrike remains in effect only until you reach the end of the text on the screen, when *Textra* switches back into insert mode. (*Textra* notes on its help screen that this is nor-

The reformat mode allows you to reformat an entire document or just a single paragraph.

mal.) I find it more convenient to work in an overstrike mode most of the time. I often adjust text as I write, and using the insert mode, rather than overstrike, can create problems for me when I reformat text. Other people may not even notice it, but it's something to keep in mind if you want to use *Textra* and are used to a word processor that normally uses overstrike.

If you want to enter a large amount of text between sentences or paragraphs, you can use the "Insert blank line" option by pressing the F2 key. Hitting this key brings space for new text onto the screen.

Dizzying Delete Array

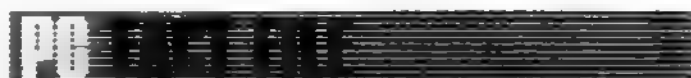
Textra gives you a dizzying array of delete options, most of which are implemented with the function keys. The current version of *Textra* makes use of the F6 key for deletions at and to the right of the cursor. Other deletions are handled similarly: F8 deletes the end of a line; F5 (or the Backspace key, or Ctrl-H) deletes text to the left of the cursor; F7 deletes a line; Ctrl-F9 deletes the top of the file; and Ctrl-F10 deletes the bottom of the file. The delete modes present few problems, and after using *Textra* for a while, I found that it handles deletions quite conveniently. It's much easier to hit one key, F8, to delete all the text to the end of a line than

to use one or two keys in combination with the Ctrl key for deletions. Ann Arbor's new release of *Textra*, 3.0, corrects a problem in earlier versions that some users had complained about: the use of the PC's Del key. Earlier versions relied solely on F6 to delete text to the right of the cursor; with Version 3.0 you simply hit the Del key to do this.

You can set *Textra's* program defaults to implement the reformatting and word-wrap features, or you can override them by changing the program's file defaults for a specific document. This latter feature is a helpful one if you use *Textra* as a program editor, because it means your program lines will stay where they belong, rather than be automatically reformatted into paragraph form. You must remember to override the program defaults because *Textra* fails to see carriage returns unless a space is left between lines. While you could set all the program defaults to toggle off word wrap and reformatting, you would have to remember to turn them on when you used the program for a letter or document.

Textra's reformatting is quick but not totally automatic. For example, let's say you are revising a paragraph. When the cursor reaches the edge of the screen, an ampersand appears to tell you the line is too long for display. If you keep typing, the text quickly wraps around and the ampersand disappears. Nevertheless, you must wait until you hit a cursor-control key before the text will be reformatted. This feature, which takes some getting used to, means that if you make extensive alterations to a lengthy document, you must remember to reformat the whole thing when you are done.

Accessed via F3 and Alt-F3, the reformat mode allows you to reformat an entire document or just a single paragraph. When you press the Alt-F3 combination you are presented with choices for all the function keys. You can protect paragraphs from reformatting or skip paragraphs altogether so that they remain unaffected by the reformatting command. Skipping dif-



Textra, Version 3.0

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fers from protecting in that the protected paragraph retains its original characteristics. A skipped paragraph can be included at any time in a global reformat. One drawback to *Textra*'s reformatting method is that even though you hit the Tab key for a paragraph indent, you never see a true paragraph indent until the reformatting takes place. Paragraph indentation is handled by the program's defaults.

The F3 key allows you quickly to reformat one paragraph only. Older versions of *Textra* didn't use the Alt-F3 combination for the reformat menu; instead, a simple F3 handled it. The latest version has simplified reformatting—under the old program you had to hit F3, make your menu choice, and hit F3 again to exit. In Version 3.0, F3 is used to reformat a single paragraph, while Alt-F3 handles more complex reformatting chores that may not be done as often.

Full-Screen Editing

Textra is a screen-oriented text processor. Unlike a page-oriented word processor with which you write one page at a time, which is subsequently saved, *Textra* presents a full screen of copy from top to

bottom. With a screen-oriented text processor you can see all of your text by maneuvering the PgUp or PgDn keys. While this speeds your work, it doesn't give you any idea of what the final printout will look like. Fortunately, *Textra* solves this problem by allowing you to send your

Textra fails to see carriage returns unless a space is left between lines.

printout to the screen in order to preview it and make changes. (One point worth stressing is the lack of a ruler line in normal screen mode. Unless you activate the yardstick option, you can't see where your tabs are set or what your margins look like. And, if you do activate the yardstick, it doesn't remain on-screen. Instead, when you go back to normal text mode, the yardstick disappears.)

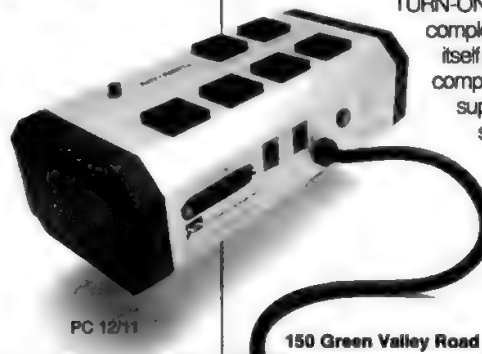
Textra's print-to-screen function is easy to use. You access it by returning to the main menu and choosing the print option (by pressing the F7 key). *Textra*

then gives you six print options that allow you to preview the text on-screen to see how it looks, print the current file, store the file to disk, print a selected number of lines, print a selected number of pages, or print a letter and envelope. The latter three functions are new to Version 3.0 of *Textra* and really add to the flexibility of the program. For instance, the "print selected lines" option, which will print one or more lines from the current document, makes it easier to print envelopes. You can use the inside address as the envelope address—when you're ready to output the letter-and-envelope combination, the envelope is already done. The final option, "print letter and envelope," prompts you through the task of printing a business letter and envelope, and speeds things up.

Because *Textra* has no built-in print spooling, you have to wait until the document has run through the printer before you can resume editing another file. Interestingly, you can stop in the middle of one file and print a second with *Textra*, but you can't go back and edit the first while printing the second. (Ann Arbor would be wise to put a print-spooling option in a future version of the program.) The print

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options section of the screen rounds out *Textra's* print menu. With it you can set some of the basic characteristics of the final document. Switches—accessed with a single keystroke—override the program's defaults and allow you to set the number of lines per page and the top and bottom margins. Switches also allow you to control page numbering, header and footer text, and the position of page numbers. The function also supports the bold-face and underlining capability of most printers. Ann Arbor uses a generic universal printer driver to interface with a wide range of printers.

Custom Alterations

You can customize just about any aspect of *Textra*, including margins and paragraph indent, as well as word wrap and auto-indent. For instance, if you plan to use *Textra* as a program editor, you can toggle off the word-wrap and reformat functions so that all of your program lines stay in the right spaces. You can also customize search-and-replace operations. For example, you can have *Textra* query you on every replacement, or you can tell it that you want it to perform a global search and replace at all times. You can make your searches case-sensitive or case-insensitive. You can customize the print and save functions, as well as declare a buffer size. Even though you may choose to customize *Textra's* defaults, you can still override those defaults by using the "switch" settings on the main menu. However, these settings remain effective only on a file-by-file basis.

Menu Structure

Once you've booted up with *Textra*, you find yourself in the edit mode. In this mode, the bottom line of the screen becomes an editing menu that shows the functions you have access to. (You can gain access to other functions by shifting to the master menu, which is also an option displayed on the bottom line of the screen.) From the master menu, you are given options for the search, replace,

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move, copy, print, merge, shift, switch, and save functions. The copy and move functions allow you to cut and paste copy within a text file, while the merge function lets you bring in text from another file. The shift functions are used to center lines and move them around so you can format the text.

Like the editing menu, *Textra's* master menu makes use of the full function-key set of the PC and shows how *Textra* has implemented the PC's function-key set. As I've already noted, the relationship of the master menu to the editing menu is unusual. Rather than first presenting you with the main menu, *Textra* puts you directly into the editing submenu and you must toggle back to the main menu with the F1 key. It isn't hard to get used to this procedure, but it is awkward. For example, to save a file, you must first hit the F1 key to bring up the main menu and then hit the F10 key to exit. At that point, you are presented with the various saving options accessed with the function keys. For instance, if you want to save and then return to the editor, you must hit F1, F10, F9, and wait. Although it takes only three keystrokes, it would be better if you could have at least a menu line that would give you options to save directly, without requiring you to look at the editing menu first.

In addition to being screen and document oriented, *Textra* is also buffer oriented. Under program control, *Textra* partitions the PC's RAM into a virtual memory buffer into which all text is input. The text, in turn, is stored in RAM until you save it to disk. Unfortunately, you must remember to dump the buffer contents to disk with the SAVE command because *Textra* hasn't automated this function. If you don't, any changes you've made will be lost forever should you inadvertently turn off the machine or exit to DOS.

The buffer limits the amount of text you can handle with this program. If your PC is equipped with 128K of RAM, the text buffer is limited to about 13 pages of single-spaced typing with 3,000 charac-



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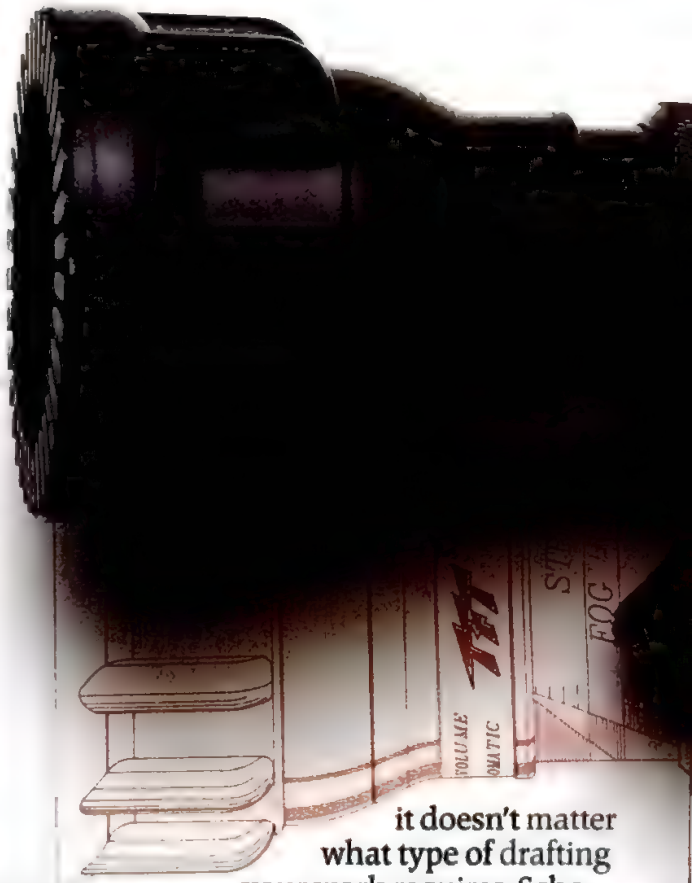
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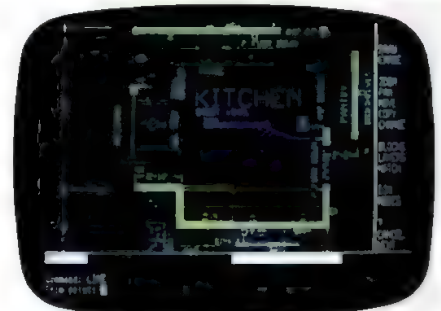


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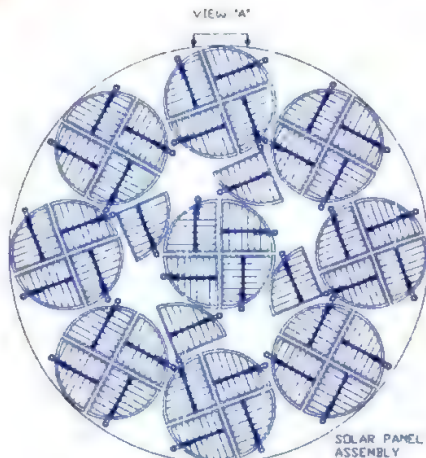
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ters per page. With 256K of RAM, the buffer is limited to 60,000 characters, or about 20 pages of single-spaced typing. These strictures make it difficult to use *Textra* with very long documents or documents imported from other word processing programs. In fact, *Textra* advises you to break such documents into smaller portions.

One considerable advantage to using a buffer is that it gives you the ability to recover deletions. Because the last deletion in is the first deletion out, you can save any deletion stored in the buffer, provided you haven't exited the delete mode. In the delete mode, the deletion option you select remains underlined on the editing menu. If you allow this option to remain in effect, without taking any keyboard action, then simply hitting the escape key will allow you to restore any deletions.

Stumbling Blocks

One feature of *Textra* that could stand improvement is the way paragraphs are displayed. After each paragraph you must insert an extra line—there's no way around it. When I attempted to begin a new paragraph without leaving the extra space, *Textra* made the new paragraph part of the older one, which means that you can't have a single-spaced document with this version. Ann Arbor admits this shortcoming and promises it will be corrected in the next release later this year. The extra line can be a convenience for business use, however, since most business letters are written with a space between paragraphs.

Another thing that I would like to see added (Ann Arbor says it's working on it) is the ability to copy or rename files directly from the main menu. Most programs

allow you to do this, and it makes file handling very convenient since you remain in the program environment. *Textra*, on the other hand, makes you exit the program, return to DOS, and then execute the command to copy or rename a file.

One nice feature of *Textra* is its ability to deal with ASCII files created by other text processors (provided they're short enough) without filtering the text file through a translation routine. Conversely, *Textra* creates straight ASCII files that can be used with other programs if you save them with the program switches off. If you forget to turn the switches off, DOS or another text processing program may see only the header data of the program without seeing the rest of the text when you "type" a file or when you try to use the file with the second word processor. When you save a file with the switches on,

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DOS may only bring the header to the screen, but it still sees the entire file as part of your directory and, of course, the file will appear with *Textra* booted. This problem occurs mainly in the protection mode, but it is defeatable and should present no trouble beyond startling you when you forget the switches.

Textra 3.0 has a number of nice features that have changed substantially since Version 2.0. For instance, there is now an option that allows you to highlight text that will be printed out in boldface. Similarly, underlining also appears directly on-screen. It is accessed with the F4 key and allows you to highlight and underline text that is already on the screen. As in Version 2.0, you can also underline and highlight text as you enter it, but the new option comes in handy.

Another change is that all text you are marking for moves, copying, merging, or protecting is now displayed in reverse video rather than in normal text mode. Yet another change, which will make this program familiar to *WordStar* users, is the fact that Ann Arbor has enabled the E, S, X, and D keys to move the cursor.

To move through a text file created

with *Textra*, you must use its label option. You can set up to eight labels per file simply by pressing the Alt-F4 combination. Each label consists of a single letter, and once it is declared you can move quickly through the file. You can also delete a label and then reset it at another spot. I would have preferred more than eight labels. Scrolling through a long file certainly cries for more than eight place marks, and once you've exhausted the supply, it's back to the PgDn key.

Finding Good Help

Documentation is provided in two forms: a very good on-disk tutorial backed up by a brief but well-written manual. The tutorial takes you through the entire program and makes you comfortable with *Textra* in a short time. It is also an excellent refresher aid.

Textra 3.0 has added an on-line help facility; Version 2.0 didn't have one. The help option is activated with the Alt-H key combination and presents you with a screen that outlines the basic cursor commands and procedures for inserting and deleting text, centering a line, reformatting a paragraph, underlining or boldfac-

ing text, and other options. In a future version of *Textra*, Ann Arbor plans to combine its excellent tutorial disk with the help facility for even more comprehensive help screens.

One of the things I liked about *Textra* is the way it tries to prevent errors. It won't let you take any action without first questioning whether you're sure you want to do it. And, if you attempt to take an action the program doesn't allow, a warning beep will sound and won't stop sounding until you take the correct action. It's a nice feature.

Fulfills Basic Needs

I found *Textra* to be easy to use and straightforward once I learned the correct keyboard moves, which didn't take long. This program should easily fulfill your basic word processing needs. It is good for short documents, memos, letters, and just about any other quick word processing chore.

Textra is one of a new breed of full-featured, low-cost word processing programs. It comes very close to being what a standalone word processor/program editor should be. ■



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Unfortunately, for many of us computer users, that's an unhappy reality. If, like me, you opted to skip typing courses in high school, you were at a loss when you later wanted to use computers.

So how can you now improve your typing skills in the comfort of your own home? I've found two ways: play a game or take a tutorial course.

MasterType was one of the first educational games to be commercially successful. And, among the more popular home computer games, it has lasted longer than most—more than 3 years.



MasterType

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Tarrytown, NY 10591
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Requires: 64K RAM, one disk drive; color/graphics adapter and color monitor optional.

CIRCLE 791 ON READER SERVICE CARD



Whoops! In this screen from *MasterType*, the typist reacted too slowly to score.

Although *MasterType* is a game, it qualifies as a classic program too. *MasterType* cannot substitute for a typing tutorial, but it is educational enough to supplement one.

Side one of the *MasterType* disk contains the program for color monitors, and the flip side has those for monochrome. Either way, it boots automatically to the main menu. From this menu you can set game parameters and skill level. These

include turning the sound on and off, lowering and raising your speed goal, and using lower- and uppercase letters. A submenu of lesson options allows you to choose from among 18 preprogrammed lessons that progress in difficulty. You begin by using only the home keys ASDF, progressing to numbers, punctuation marks, and shifted symbols, and finishing with nine-letter words.

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CIRCLE 245 ON READER SERVICE CARD

PC ARCADE

MasterType is similar to *Space Fortress*. In *Space Fortress*, the player occupies a spaceship and tries to shoot down missiles by attacking randomly from the north, east, south, and west using a joystick. In *MasterType*, letters and numbers replace the missiles, and the keyboard replaces the joystick.

Letters, Letters, and More

As each lesson begins, you see your immobile spaceship in the screen's center. Letters, letter combinations, words, numbers, or other characters in the lesson appear in the four corners, as do small alien ships that slowly move toward your position. To destroy the attacking characters, you must type the characters or words and hit the space bar before they reach your ship. The faster you destroy them, the more points you earn, and, of course, the greater your rated typing speed. However, because the method for calculating speed is not explained, you have no way to interpret the rating you're given; you cannot calculate your words per minute.

In any lesson, new attackers replace destroyed characters or words immediately until either the program wins by striking two or three hits at the same corner of your ship or you win by "typing down" 40 of them.

At the end of each lesson the screen offers a scorecard listing the lesson number, point score, average typing speed, number of words typed and destroyed, number of mistakes, and the previous high score. The results can be printed but provide no record of your specific mistakes. Without this feature, the hard copy fails to be a teaching aid.

If you keep track of your weak keys and key combinations, you can work on your typing problems. The strong point of *MasterType* is that it allows you to custom-design the game to your needs. For example, I made up what I consider the most difficult typing lesson possible, using words like zygospor, twelfth, minimums, and quixotic.

MasterType is fun to play, regardless of whether or not you want to improve your typing skills. The software was designed as entertainment first, education second. This game format can teach a lot of typing basics, particularly proper finger placement, but it offers no supporting materials for study outside the game. As such, it is better for beginning typists and action game fans.

On PC's scale of 1 to 6, *MasterType* rates:

FUN:	3.5
CHALLENGE:	4.5
GRAPHICS/SOUND:	4.5
TOTAL SCORE:	12.5



Typing Tutor III

Simon & Schuster, Inc.
1230 Avenue of the Americas
New York, NY 10020
(212) 245-6400

List Price: \$49.95

Requires: 64K RAM, one disk drive; color/graphics adapter and color monitor optional.

CIRCLE 792 ON READER SERVICE CARD

If you want a personal typing tutor with unlimited repetition that focuses on your weaknesses automatically and drills them out of you with subsequent lessons and one that doesn't self-consciously entertain you with flying saucers and colorful explosions, then read on. But be warned: The following program is made for work first, fun second.

Typing Tutor III has three activities—lessons, tests, and a game called Letter Invaders. Three types of lesson cover the alphabet keys, keyboard numbers, and, of special interest, keypad numbers. Each lesson begins with the easier keys, displaying one short line of characters at a time. You must type the line exactly, including both spacing and uppercase letters, and then press Return.

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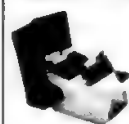
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PC Magazine Dec. 11-Dec 25, PC World Jan 1985, Submitted Oct 03, 1984

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shows the keys used so far. Keys shown in reverse video are those you are hitting faster than 20 words per minute. Actual and corrected speed and accuracy are rated. From here, you can choose whether or not to continue the lessons, build more speed, learn more keys, test progress so far, quit the program, return to the main menu, or call up a graph rating your speed or accuracy.

Typing Tutor III
keeps a record of
errors and speed
so you can work
on your weaknesses.

The program offers a corresponding test for each type of lesson. This allows you to hone your skills. Using a technique called TRM (time response monitoring), the program monitors the student's response time on every key.

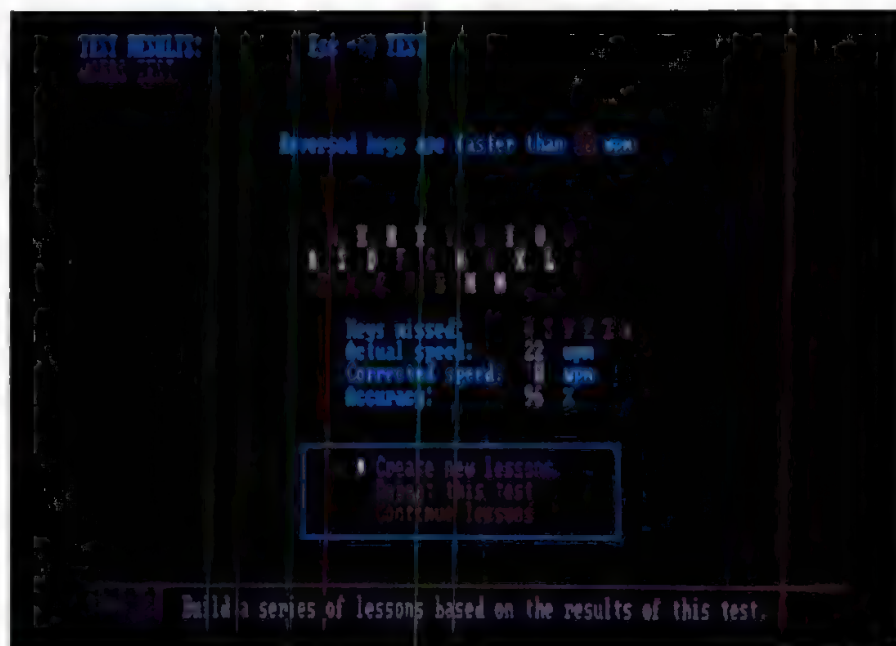
Error of Your Ways

Typing Tutor III keeps a record of errors and speed and then puts together a lesson stressing these mistakes so that you can work on your weaknesses. In my case, the program compiled a lesson emphasizing the keys Y, B, and Z. It helped me improve my overall performance by pointing out the keys that slow me down.

The program also includes a standard typing speed test, comparable to those given by many employers. This gives you a true measure of your words per minute. Also, a utility program allows you to change the words and sentences used in the test after they become overfamiliar to you.

Last, and of least importance to the user, is the high-speed action game, *Letter Invaders*. As you might assume, keyboard characters run from the top to the bottom of the screen, as in the by-now generally familiar *Space Invaders*. Your task is to type each before it passes off the

PC ARCADE



This screen from *Typing Tutor III* urges you back to the keyboard for a newly created lesson.

screen. This exercise does not strengthen finger placement, speed, or accuracy, as the rest of the program does. And the negligible graphics and sound effects of *Letter Invaders* make it seem dull next to those of *MasterType*.

If you are interested in improving your typing skills but lack self-discipline, *MasterType* is the solution. *MasterType* may be limited but it's exciting. If, though, you are mainly interested in mastering the keyboard, you may want to forego the fun of the games and use *Typing Tutor III*.

On PC's scale of 1 to 6, *Typing Tutor III* rates:

FUN:	2.5
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Computer Intimacy: A Mirror of the Mind

Two new books explore the historical, philosophical, and psychological impact of computers on our culture—especially on our language, self-image, and thought processes.

Two provocative new books share the same central observation: the dramatic spurt in computer use engendered profound and widespread effects on society, even on computer users. Each book explores a previously unexamined phenomenon traceable to the computer's impact on our culture.

Turkle's *The Second Self* studies how people view themselves in relation to a responsive machine, from the child who learns to transfer their programming into everyday self-mastery to grown-up hackers unwilling to give up the control they exhibit. Bolter, in *Turing's Man*, traces the intellectual consequences of the computer back to classical times.

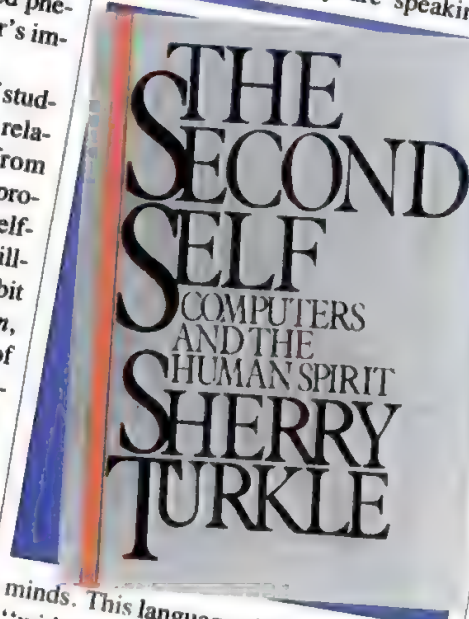
Computers and Everyday Speech

People today have begun to describe themselves as "stuck in an endless loop" or to say they are clearing their "buffers," meaning they are speaking their

a joint doctorate in psychology and sociology from Harvard. I cite her credentials here because her experience primed her to recognize the earliest indications of a shift away from Freudian vehicles in exploring personal experiences and toward another language for self-reference entirely, a "computational language."

In *The Second Self*, Turkle first investigates the effect of computers on children's psychology and learning, advancing the frontiers of territory initially explored by Jean Piaget and Seymour Papert. She notes the benefits and drawbacks the computer has on the development of many types of personalities, how computer toys confuse the issue between the animate and inanimate, and the nature of video "addiction." However, her most significant conclusion, phrased in her consistently understated manner, is that "in general, the presence of computers does not lead children to think of people as machines."

Plunked down in M.I.T.'s hacker haven like Dorothy in Oz, Turkle devotes her book's second part to delineating the personality types who give everything over to their hacking. It is, she says, "a culture of loners who are never alone"—people whose behavior, appearance, and obsessions separate them from the "straight" world but strongly bind them together. For example, Alex, who



mind. This language phenomenon plays "with the idea of mind as machine, personality as program," an attitude that can only become more widespread as microcomputers continue to proliferate. So says Sherry Turkle in her studiously written, thoroughly researched, and admirably cautious book, *The Second Self*. The book concerns itself with personality and computers. Its author holds

PC MAGAZINE
PRICE CARD
R 11, 1984

BOOK REVIEW

spends "at least 15" hours a day on the computer, explains the seductive refuge he finds there. "I certainly don't think of it as a person there, but that doesn't mean I don't *feel* it as a person there. Particularly since I have personalized my interface with the system to suit myself. So it's like being with another person, but not a strange person."

Artificial Intelligence

Turkle's last section on artificial intelligence connects the rapid assimilation of AI terms into the language to a nervous preoccupation with the self as machine—similar, perhaps, to a more nervous and guilty preoccupation with the self as sexual being that, Turkle says, permits acceptance of Freudian theory. Turkle acts as an observer, not as a participant. Yet it's clear from her report that de-

veloping a synthetic intelligence doesn't "dehumanize" people—instead it lets us focus on our inimitable qualities, establishing our differences not just from the beasts but from the machines—and this realization fires her antihyperbolic prose until the section soars.

Few computer books are as careful or as thorough as *The Second Self*, hardly any break as much new ground, and almost none offer as much insight.

Turing's Man

In 1950, British computer theorist Alan Turing shocked the public and his computing colleagues when he predicted that within 50 years' time there would be machines capable of simulating human thinking processes so cannily that they wouldn't be unmasked even after 5 minutes of questioning in a blind test.

That date, and that measure, were based not on special foreknowledge of the course of computer and artificial intelligence development but on several shrewd deductions. Yet the accuracy of his prediction and even the much debated question of whether machines can properly be said to think are less important than Turing's having signaled—at the very dawn of the computer age—a change in the perception of what it means to think. People, reflected in their new invention, have become "information processors."

It is this latter consequence of Turing's prediction that David Bolter apothecizes when, in his exploration of the computer as a "defining technology" he labels "Turing's man" as anyone who has begun to think and speak in terms suggested by the computer. Cl

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BOOK REVIEW

ly, in the life of such a man, the mechanical philosophy of Cartesian man, with clockwork and heat-engine metaphors for the universe, its activity, and its inhabitants, has been superseded.

Turing's Man is not all philosophy, of course. It is composed, in part, to serve as an introduction to computers: perhaps 40 percent of the text comprises a lucid tutorial on their design and inner workings. But it differs radically from any introductory book ever issued on the subject in three significant ways.

First, it begins by discussing the importance of the computer as the defining technology of our age. It serves as a metaphor or model for our scientists, philosophers, and writers.

Second, unlike the many books aimed at novice users and business executives, *Turing's Man* was written as a "bridge between the world of science and the traditional worlds of philosophy, history, and art"—a service that it performs with distinction. Chapters begin by explaining some aspect of the computer, such as memory and storage, and then offer an examination of how the same concept was viewed in the classical, medieval, Renaissance, Enlightenment, and industrial periods.

Third, as a consequence of his approach, Bolter's concluding chapter on artificial intelligence fairly resonates from its historical reference; while he has

been educating humanists in computer operations, he has also been tracing a 2,500-year lineage for the technologists.

Consequently, *Turing's Man* is the

book to buy for that teacher or anti-technologist friend who says, "Computers aren't for me." It offers convincing arguments that they are. ■



Turing's Man: Western Culture in the Computer Age

J. David Bolter

University of N. Carolina Press

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Two new software packages from CBS Software, although flawed, can teach you something about management and new ways to motivate and communicate with your employees.

If your mental directory is filled to overflowing with spreadsheet and word processing software, you may be excited to see a new genre of business software emerging. This new software seeks to advise you, enlighten you, and help you know more about your job skills. One example is the Managing for Success series. Developed by Thoughtware, Inc., and marketed by CBS Software, it consists of two programs, *Personal Management* and *People Management*. (For a review of another Thoughtware program, *Assessing Personal Management Skills*, see "Rating Managerial Skill," PC, Volume 3 Number 22.)

Personal Management assesses your management style, explains the management process, and assists you in planning a management career. *People Management* focuses on your interaction with



others and guides you in understanding leadership, team building, motivation, and communications.

Easy Operation

These programs differ in some refreshing ways from the usual "productivity tool" software. For example, you don't have to learn anything to use them. If you know how to insert your DOS disk, you're all set. You load BASICA, insert a program disk, type in RUN "CBS," and that's that.

One 15-page paperback manual covers each program. Most of the pages consist of worksheets that help you to track and interpret your results and prepare a

follow-up training program.

Each program consists of several disks, each of which is a unit. Two or three subunits are on each disk. From an on-screen chart, you select the subunit you want to run. You can terminate the subunit you're working on and return to the main chart, but you can't restart in the middle of a subunit, so if you terminate, you've got to start over.

Initially, I found *People Management* and *Personal Management* tedious, though I eventually discovered they are also instructive and thought provoking. Unfortunately, a lack of finesse interferes with their instructional value.

Kludgy Design

Because the programs are written in BASIC, 15 seconds often elapse before one screen fades and the next appears. If you're accustomed to a lightning-fast screen response, you won't find this sluggishness very tolerable.

The rating scales are inconsistent. For instance, questions that assess your understanding of leadership use a scale on which 1 means "to a great extent" and 4 means "to a limited extent." But for questions that test your understanding of effective teamwork, the scale is reversed.

The presentation is plagued with such inconsistencies. A series of questions on



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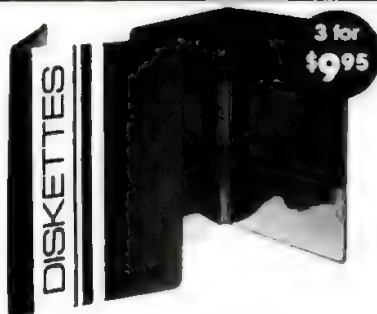
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management attitudes is numbered, but you are not told in advance how many questions there will be. An assessment of your attitude toward management practices, on the other hand, states the number of questions to expect but doesn't number each one as it's displayed.

The programs' responses to multiple-choice questions are irritating. When in one case I selected the wrong answer, the program told me so and let me try again. When I chose a second wrong answer, the program did not recognize that I had missed two out of three and explain the right answer; it simply repeated that my answer was wrong and let me try once more. Even in BASIC, it's possible for a bit of program logic to track responses to questions.

At the beginning of each unit, you're prompted for your name and told which subunits in that unit you've completed. I had put a write-protect tab on one of the disks before starting; after entering my name, the program aborted with the message "Disk write-protected in 840" and threw me back into BASIC.

A Liberal Philosophy

The management philosophy of these programs emphasizes feedback, recognition, employee participation, mutual support, and open communications. The tone of the material presented is consistent with this philosophy: If you answer a question correctly, the program responds with a hearty "Yes!" If you give an answer the program considers wrong, you are gently told that your answer is not the right one and are encouraged to try again.

As with most things in life, if you do it right with these programs, you often don't learn as much as if you first do it wrong. If the same exercises were presented in a book, you would be able to review the explanations of both the right and the wrong answers; you should have the same option here.

If you're the sort of person who is suspicious of software that purports to know what's best for you, be sure to

look at the last page of the manual. There you are told, "Each program is the joint effort of a number of individuals who are specialists in business administration, organization development, educational psychology, computer programming, instructional design, and graphic layout"; a list of individuals who contributed to the programs follows. This vendor really practices what it preaches in its software!

Nevertheless, my background is also in psychology, computers, and manage-

The management philosophy of these two programs emphasizes open communications.

ment, and I was troubled by some of the assessments. For example, the evaluation of management style compared my score with scores of several thousand entry-level and experienced managers who've taken the same test. In communicating goals and standards, entry-level managers scored 21 out of a possible 30. Experienced managers scored 24—only a 3-point difference. Could the differences between entry-level and experienced managers really be this small?

I reran this exercise, answering "undecided" to each question. The score of a manager who was undecided on every single point was identical to, or just a few points below, the score for entry-level managers. Does this result mean that indecisive people have a potential for management?

Questionable Results

The narrative accompanying these scores states, "More-experienced managers generally believe in an active supervisory style; less-experienced managers tend to believe in a more passive style." Nonsense! This difference is not

between experienced and inexperienced managers; it's between good and bad managers. In reality, newly promoted managers often exhibit a demonstrably active management style, whereas experienced managers, worn down by years of being on the firing line, often resort to a passive style.

In an analysis of my ability to run my own business, I was told I demonstrate some of the necessary attributes—but I wasn't told which ones. I took the test again, giving answers indicating extreme inability to plan, think, or work on my own. This time I was told that I was "cut out to manage my own business." This isn't computer-based training; it's computer-based hedging!

Valuable Lessons

It's easy to criticize programs of this kind. In fact, however, you can learn a lot about yourself, your management style, and the management process. They have some good training material on team building, communication patterns, and leadership strategies. The use of graphics and color in soliciting your input and displaying results is creative and varied.

Nonmanagers unfamiliar with the management process can gain a sense of the topics managers have to think about and deal with. Young people contemplating career possibilities can get an idea (even if oversimplified and idealistic to some degree) of what management is about.

Because they are interactive, these programs take much longer to get through than they would if the information were simply presented in narrative form. If I were contemplating spending \$79.95 per program, I'd probably decide to use the money on a couple of good books and keep the change.

Naomi Karten is president of Karten Associates, a Randolph, Massachusetts-based management consulting firm specializing in microcomputer technology.

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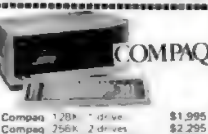
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Investor Software: Two Approaches

Software Arts's Financial Management TK!SolverPack program and Standard & Poor's Stockpak II data service offer different kinds of help to fit the needs of different investors.



All investors have systems. Some, like horse players, devise their own, idiosyncratic formulas for success. Others stick to tried-and-true methods. The new *Financial Management TK!SolverPack* from Software Arts is designed to help formula players develop their own approach, while a new Standard & Poor's service called Stockpak II seems oriented toward investors who prefer traditional methods.

Stock market investors use formulas in two main ways. Fundamental analysts look at statistics surrounding the security itself (for example, the total revenues of the company, price/earnings ratio, sales, or dividends paid). While fundamental

analysis has always been favored by the research departments of brokerage firms and banks, serious individual investors seem to gravitate toward technical analysis, the study of current and historic prices and volumes. There are good, practical reasons for this difference in approach.

To perform fundamental analysis, you need a good deal of information concerning the companies you wish to analyze. Large banks and brokerage houses have always had access to this information through large, expensive database services. Data used in technical analysis, on the other hand, are available relatively inexpensively from such firms as Dow

Jones and CompuServe.

Standard & Poor's has long been in the business of supplying data for fundamental analysis. Its COMPUSTAT database, the best-known source of accurate, comprehensive fundamental data available, is provided on a time-sharing basis directly to analysts in large corporations.

Stockpak II

Drawing on this massive reservoir of data, Standard & Poor's has introduced Stockpak II, a service that entitles individual subscribers to 12 monthly disks. You can choose to receive data on various combinations of 1,500 NYSE, 800 ASE, and 2,300 OTC issues. The data are prepared as of the last trading date of the month, and you receive the disk ap-



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Other menu options let you compare several securities, select all securities from the database that meet specified criteria, prepare a report, and change various system parameters.

The Stockpak II software performs these activities quickly and easily. Its limited documentation proves comprehensive enough to allow you to rapidly become expert at using the program. It includes 11 pages of clear definitions for the data and ratio information displayed by the system.

However, Stockpak II doesn't let you access its data using 1-2-3, VisiCalc, or any other program. Also, the program doesn't operate under PC-DOS, preventing you from easily developing your own interface. (Standard & Poor's states that it may soon alleviate this problem.)

These complaints aside, Stockpak II is a good product at a reasonable price. It is well worth the attention of anyone with even a passing interest in the fundamental analysis of securities.

On Your Own with TK!Solver

Some formula players wish to perform analyses not covered by any kind of software package. They want to use advanced formulas taken from textbooks or based on their own unique strategies, such as a risk-reward analysis or a hedging formula developed through personal trial and error. Until now, the personal computer has done little to assist this type of formula player.

This investor often wants to use a rule or equation containing such variables as the market price of a security or the treasury discount rate. Typically, investors obtain this information from an outside source and then personally enter it into the equation. Once the investor has collected known variables and entered them, he or she solves the equation by mathematical calculation.

Spreadsheets can assist such investors somewhat, but the formulas found in spreadsheets are aimed at finding only one answer. This investor needs a multi-directional solution.

If, for instance, the formula for interest is the principal of the loan multiplied by the interest rate multiplied by the time of the loan ($I = P * R * T$), in a spreadsheet the principal would go in Column A, Row 3; the rate in B3; the time in C3; and, finally, the formula $+A3*B3*C3$ in D3. Changing any of the variables in Columns A, B, or C in row 3 automatically changes the answer in D3.

In some situations, however, you already know the total interest but not the rate. Nevertheless, you can't enter the total interest in D3 and get the rate in B3.



Financial Management TK!SolverPack
Software Arts, Inc.

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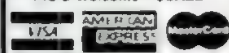
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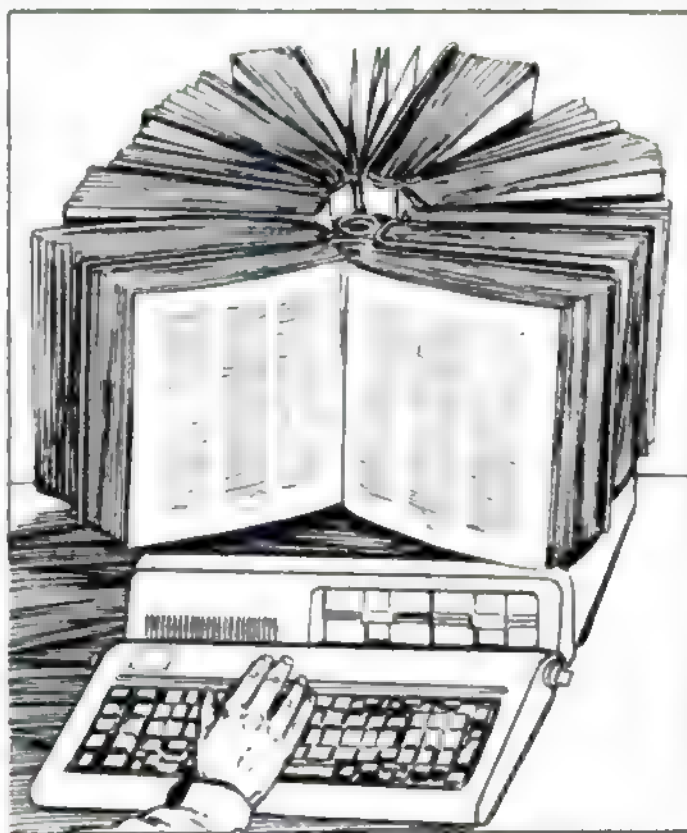
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The most important element in the diagnosis and treatment of disease is the knowledge physicians draw upon to make clinical decisions. Fortunately, that knowledge is fed daily by a rapidly growing number of medical journals. But with more than 1,500 periodicals currently available, few libraries come close to stocking all the different journals a physician needs in a given month. In fact, few hospital libraries even store the unabridged *Index Medicus*, the bible of medical literature researchers.

Of course, Medline, the on-line database of the National Library of Medicine, has been around for many years, but it hasn't been accessible to anyone but librarians until recently. When I was in medical school, I would



have to ask a librarian to do a Medline search for me, and then I'd have to wait 24 hours to pick up the results. Only trained personnel were able to access the complex Medline system because a search required you to use thick manuals full of Medline search terms and often took several hours to complete.

Today, accessing all types of medical information is as easy as making a phone call. Several companies now offer quick access to Medline and other medical databases for physicians with PCs. For a fee, which varies according to the service, you can use your modem to search through any of them at almost any time, day or night.

In this and future issues, I'll look at the on-line services of several companies that have entered the market.

BRS

Bibliographic Retrieval Services (BRS) has selected the medical community as its primary marketing target. Its creators have made an effort to simplify the search process by offering an easier interface to the labyrinthine Medline. In addition, they've collaborated with Saunders, a publisher of medical books, to produce a full-text on-line medical library containing references from that publisher and others. BRS has also recently contracted with several medical journals to supply the full text of those publications on-line. (For more information on BRS and its low-cost subsidiary, BRS/After Dark, see "Tricks of the On-Line Trade" and "On-Line House Calls," *PC*, Volume 3 Number 20.)

Instructions for using BRS come in an 8½-by-11 loose-leaf binder. The access phone numbers in my copy were a little out of date, but its toll-free hot-line number gives the latest information. The rest of the documentation, which is concise and easy to understand, offers plenty of specific examples that make it easy to begin simple searching after about a half-hour.

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MEDICINE

specify the display width and number of lines you require for your particular terminal. You then choose to view or bypass a date-stamped system update message. Finally, you choose from a menu listing the different available libraries.

Medline and MeSH

If you choose the Biomedical Bibliographic Library, several headings are available under that selection, including the entire Medline series—from the present back to 1966—and a database offering pharmaceutical abstracts and health and premed information for college students.

I found that Medline and MeSH (Medical Subject Headings), which lists the most current Medline data, offer the most useful information. When you enter MeSH, the system defaults to the search

mode and then all you do is enter the key term you want in and press Enter. After a few seconds the system tells you how many articles fit your search criteria.

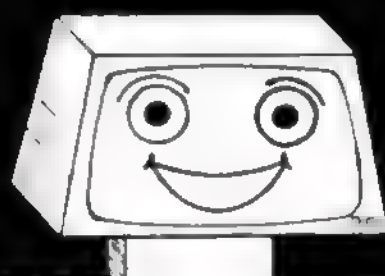
The Biomedical Bibliographic Library includes a database offering pharmaceutical abstracts.

You can narrow the field by combining earlier searches with new terms or entering several key words linked by the logical operators *and*, *or*, *with*, *same*, and *not*. To any series of letters, you can add

a truncation symbol (\$) that acts like a wildcard. For example, *consult\$* will find *consults*, *consulting*, *consultation*, and so forth. After you've entered all your terms, you can review the results of any search by pressing P for print.

Initial Problems

I did searches on nurse burnout in the intensive care unit, hematuria in joggers, and recent advances in diaphragmatic pacemakers. My initial problems were typical of database searching and are also the obstacles that keep many physicians away from these services. For example, I was able to retrieve 156 citations for *burnout*, none for *burn-out*, and 22 for *burn out*. Then, when I combined the largest list with *nurs\$*, I received a message that too many articles fit the description and that my search should be restruc-



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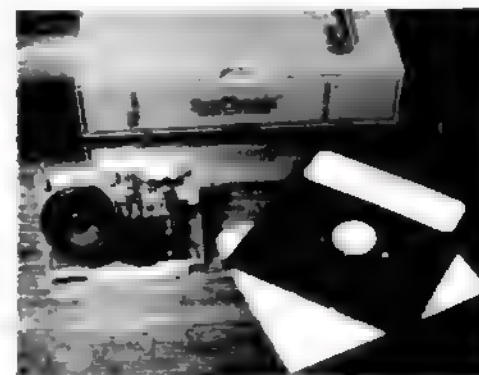
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tured. I received no articles for combining S1 (the screen notation for search 1) with *nurse, nursing, staff, or employee*. I called the toll-free number and was told to enter 1 for search 1 instead of imitating the screen prompt. The results were far more satisfying after that—I turned up 60 or 70 appropriate articles for each search.

Reviewing the Citations

My next problem involved reviewing the articles I found. Once you've discovered that 75 articles fit your search criteria, you need to display all the citations. If you use the short form, you get the author, title, source, and date for each article. Then, on a scratch pad, you need to keep track of the articles you'd like to review in long form (with abstract, key word list, and several other categories of

information). The long-form citations appear on the screen one at a time.

The Full-Text Library

The full-text library, which you access by choosing the entry labeled Biomedical Complete Text Library from the main menu, presents other problems. You search through this database in the same way that you search the current literature database. However, you don't have the option to search through a particular text or even a list of the available texts. And since some of the texts contain nonmedical information, such as book reviews, many citations that are displayed have little to do with your subject.

I decided to search topics in the field of critical care, a topic that occurs frequently in the full-text library. Initially, I searched for articles on the treatment of

acute myocardial infarction. After 15 minutes (running into the same problems that I found while searching the current reference library), I only found a few paragraphs from a book review about the myocardium. Other citations were displayed as well, but many of them were not really related to my question. Even with help from the help-line staff, I wasn't able to gain much information from this library.

BRS's access to Medline however, is enough to make me subscribe to the service. The price is modest, and I use the library frequently enough to justify the expenditure. I'm also willing—as perhaps you will be—to put up with a little difficulty in searching as a trade-off for the convenience of being able to access Medline from my office or home during the day or night. ■

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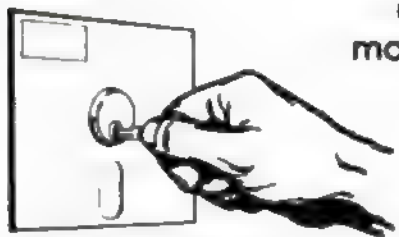
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SCIENCE

languages, *muMath* can operate on fractions as fractions. If you ask it to add $\frac{1}{2}$ to $\frac{1}{4}$, it responds $\frac{3}{4}$ —it doesn't automatically convert to decimal form.

A Math Calculator

muMath resembles BASIC in that both can be used very conveniently in direct mode. However, BASIC cannot compete with *muMath* as a mathematics calculator because it lacks most advanced functions. For example, the factorial function, which is useful for computing probability, is the product of consecutive integers. A factorial is denoted by an exclamation point; for example, $10! = 1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 \cdot 6 \cdot 7 \cdot 8 \cdot 9 \cdot 10$. To compute $20!$ in BASIC or in FORTRAN, you must create a loop because neither language includes the factorial command. In *muMath*, you simply insert an exclamation point after the number to get your result.

```
? 20! ;
@: 2432902008176640000
```

Advanced Functions

muMath goes well beyond BASIC and most other languages. Heretofore, many functions for solving problems in algebra, trigonometry, and calculus were available only on mainframes. For example, *muMath* can solve polynomial equations as high as the fourth degree for any variable. The SOLVE command has two arguments: the equation to be solved and the variable for solution. If there are two variables in the equation, *muMath* will happily solve for one variable in terms of the other variable:

```
? SOLVE(x^2-ax-6a^2==0, x) ;
@: {x==3a, x== -2a}
? SOLVE(x^2-ax-6a^2==0, a) ;
@: {a== -x/2, a== x/3}
```

As a writer of student solution manuals for university calculus texts, I find *muMath*'s skills in differentiation and integration to be one of its greatest attractions. If you wish to find the area under the curve $y = x^3$ as x varies from a to b ;

use the following command:

```
? DEFINT(x^3, x, a, b) ;
```

muMath returns:

```
@: (-a^4+b^4)/4
```

In fact, you can even nest the definite integral function to compute triple integrals if the integrals fall within *muMath*'s computational ability:

```
? DEFINT(DEFINT(DEFINT(Z/2
r^3 SIN(2t), z, 0, b), r,
0, a), t, 0, #PI/2) ;
@: a^4b^2/16
```

Note the use of the constant #PI. Since *muMath* doesn't use the decimal approximation 3.14 for pi, it needs a symbol to represent the number. Other *muMath* constants are #E for the base of the natural logarithms and #I for the square root of -1.

These functions are available in different program units that you can assemble into a personalized *muMath* system. This option is especially important in low-memory configurations. However, the program MUSIMP.COM and a system file containing all of the standard *muMath* packages occupy less than 94K of disk space. In a PC with 512K RAM, you can comfortably place all of the *muMath* features at your beck and call.

Despite its advanced functionality, *muMath* uses an easily understood syntax that resembles common mathematical notation. Scientists and mathematicians will find its straightforward commands simple to learn. All of the *muMath* packages are provided as ASCII text files, which are source codes for the muSimp interpreter. If you take the trouble to study the code and learn muSimp, you can add extensions to *muMath*. The Soft Warehouse offers a subscription to its newsletter, which provides listings of user-contributed enhancements.

Microsoft *muMath* is a special product for people with special mathematical needs. And for such users, *muMath* is without peer. ■

PC User Groups

This list is a partial directory of PC user group names and addresses. Use this listing to locate other PC aficionados who congregate in your area or around the world.

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Capitol PC

c/o Wesley K. Merchant
3277 Victor Cir.
Annandale, VA 22003
(703) 560-0979

Peninsula IBM PC User Group

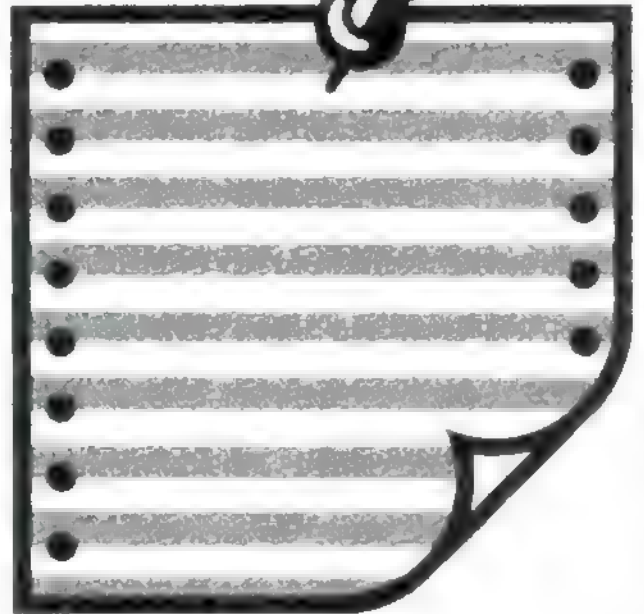
c/o Mike Savin
P.O. Box 7476, Riverdale Station
Hampton, VA 23666
(804) 898-3849

The Central Virginia User Group

c/o Webb Blackman, Jr.
P.O. Box 34446
Richmond, VA 23234

PC-Tidewater User Group

c/o Vic Freeman
P.O. Box 64454
Virginia Beach, VA 23464



WASHINGTON

THE PNW IBM User Group

P.O. Box 3363
Bellevue, WA 98009

BorderLine IBM PC Users Group

c/o Gary B. Rohrabough
2812 Cedarwood Ave.
Bellingham, WA 98225
(206) 671-3181
(206) 676-0999

IBM-Medical User Group

c/o Roger B. Lee, M.D. Col MC
Department of Obstetrics and
Gynecology
Madigan Army Medical Center
Tacoma, WA 98431
(206) 967-6732

Pacific Northwest

IBM PC Users Group

c/o William Mohn
P.O. Box 3363
Bellevue, WA 98009

Yakima Valley PC/Users Group

c/o George D. Eastman
4205 West Way
Yakima, WA 98908
(509) 966-4993

WISCONSIN

Madison IBM-PC User's Group

c/o Philip J. Niehoff
P.O. Box 2598
Madison, WI 53701-2598
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PC will publish a periodic listing of PC user groups. Send new addresses or address changes to "Club News," PC, One Park Ave., New York, NY 10016. New groups and address changes are shown entirely in **boldface**.

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6 p.m. to 8 a.m.

Milwaukee Area IBM PC User Group

P.O. Box 305
Elm Grove, WI 53122

Co-operators Microcomputer Club

c/o Adrian Groenendyle
The Co-operators
1920 College Ave.
Regina, Saskatchewan
Canada S4P 1C4

Niagara District IBM PC Users Group

c/o Mr. S. R. Drake
6 Rodman Hall Dr.
St. Catharines, Ontario
Canada L2R 1P2

CANADA

London IBM PC Users Group

Box 1141
Station "B"
London, Ontario
Canada N6A 5K2

Personal Computer Association (PCA)

P.O. Box 251
Ajax, Ontario
Canada L1S 3C3
Telex: 06-986766

Northern Alberta PC User Group

c/o Jim Laviolette
37 Brunswick Crescent
St. Albert, Alberta
Canada T8N 2K5
(403) 458-9066

The Southern Alberta

IBM PC User Group
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Calgary, Alberta
Canada T2N 2R2
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The Greater Victoria IBM PC User's Group

c/o Dennis Wellborn
P.O. Box 6051, Station C
Victoria, BC
Canada V8P 5L4

IBM PC Users Group of Winnipeg

c/o BDI Business Development
International
P.O. Box 5, Station A
Winnipeg, Manitoba
Canada R3K 1Z9

The Personal Computer Club of Toronto

c/o Leon Rudanycz
P.O. Box 266, Station 'A'
Toronto, Ontario
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Burl-Oak IBM PC Users' Club

c/o Keith Miller
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Oakville, Ontario
Canada L6L 1M3

Club des utilisateurs d'IBM PC de Montréal

c/o Bernard Mataigne
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CLUB NEWS

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Station F, Ottawa, Ontario
Canada K2C 3S8

INTERNATIONAL

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PC Club Zürich
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(List Price: with 128K RAM, \$295; with 384K RAM, \$625)

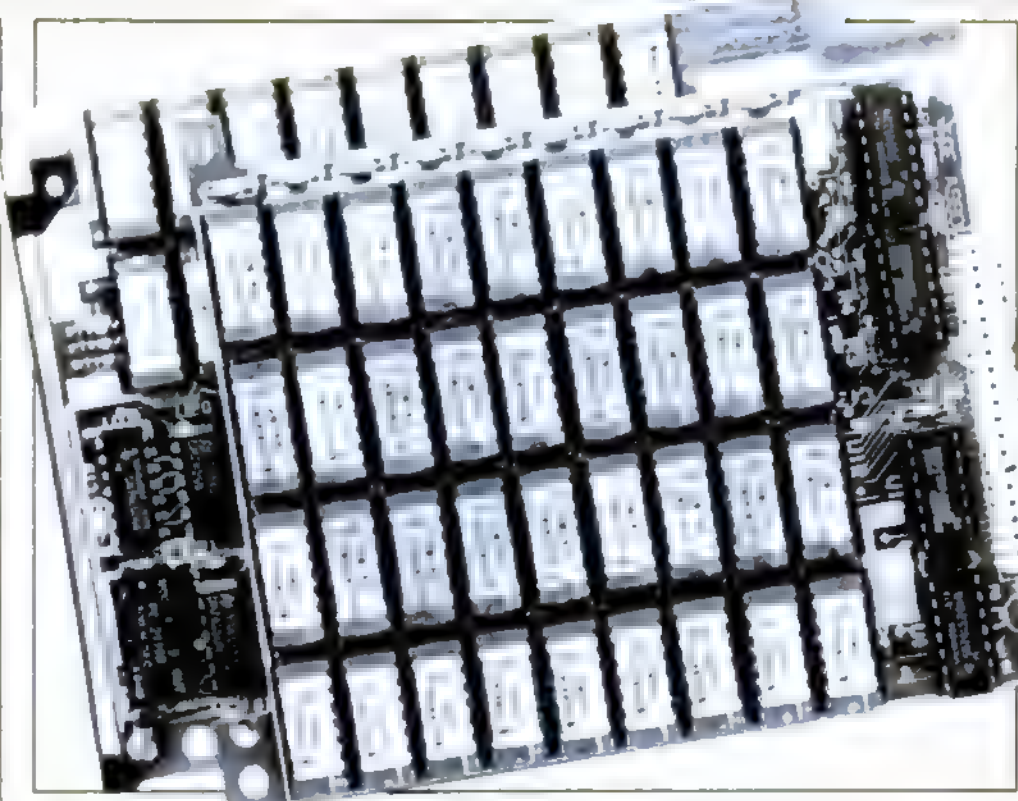
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The boards can accept voice input from a standard microphone, telephone, or local area network interface. The voice input is compressed, stored on disk, and replayed under



IDEA Minimax, IDE Associates Inc.

software control. The boards feature unlimited vocabulary and tonal quality, data storage rates averaging 2K per second for telephone quality messages, and user-selectable sampling frequencies of 4, 6, or 8 kHz.

Three configuration options are available. DIALOG/1 provides basic voice I/O capability. DIALOG/2 adds the phone interface, auto-dial and auto-answer firmware, and touch-tone decoding. DIALOG/3 adds a 300-bps modem and digital transmission firmware. All three models include a set of software device drivers for accessing their features from the user's own applications. Also included is a programming interface for BASIC, Pascal, C, and IBM Assembler languages.
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To access a system protected by CyLock, a user first inserts a Data Key and enters a corresponding

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After gaining authorized access to a protected system, the user can safeguard data files in additional ways. Files can be encrypted/decrypted and designated for private or shared use. If a file is to be shared, the user can designate it as "read only" or grant full read/write privileges to other users.
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HARDWARE

plications programs.

Front-panel controls include an on/off switch with an LED indicator; brightness, contrast, and volume controls; and a text switch, which permits text to be displayed in green instead of white. A handy, optional tilt/swivel base stand is also available for the Color 600.

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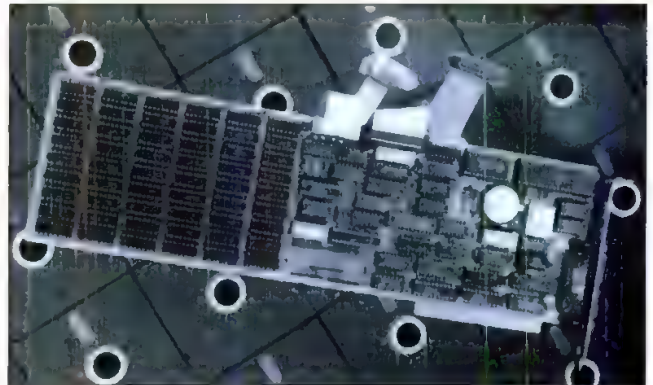
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A series of expansion systems available in capacities of 40, 65, 140, and 280 megabytes, with an optional 1/4-inch or 1/2-inch 9-track tape backup. The drives provide features that overcome the IBM PC's expansion limits, such as allowing files larger than 32 MB to be processed conveniently and permitting PC-DOS 2.0 to read and write files of up to 120 MB in a single, logical volume. Also included are utilities for downloading main-frame data files and user-configurable disk catching of up to 512 KB (permit-



RAM+6, Seattle Computer

ting rapid access to frequently used files).

The subsystems are enclosed in cabinets styled to complement the IBM PC and incorporate six expansion board slots. Operating systems supported include PC-DOS 2.x and 3.0, QNX, PC/IX, Concurrent DOS, and UCSD p-System.

(List Price: \$4,350-\$15,850, depending upon capacity)

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CIRCLE 710 ON READER
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RAM+6

A full-length multifunction board offering a clock/calendar with battery backup, a parallel printer port, an RS-232 serial port, a joystick port, and options for up to 384K RAM. Also included is FLASH DISK RAMdisk and FLASH PRINT print-spooling software.

The board's memory op-

tions allow the user to add up to 384K RAM to that already on the IBM PC's motherboard. With 256K on the motherboard, the RAM+6 allows the user to bring the system total up to 640K, the maximum amount of RAM directly addressable by PC-DOS. The FLASH DISK utility allows a portion of this added memory to be used as a high-speed RAMdisk. Two different versions of the utility are provided, one each for PC-DOS versions 1.1 and 2.x.

The FLASH PRINT spooling utility works with both the serial and parallel ports of the RAM+6 card. Up to 64K RAM can be set aside as a print buffer. (List Price: With 64K RAM, \$395)

Seattle Computer

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PS Hard Disk Series, Emerald Systems Corp.

SOFTWARE

SOFTWARE

Software Performance and Timing Analyzer (SPTA)

A set of four basic utilities for evaluating the performance of applications under development, allowing the programmer to pinpoint bugs that affect timing. The software is specifically designed for use with systems equipped with the manufacturer's PC Probe program-debugging board.

Program Activity Measurement displays a histogram of the application being executed, showing the percentage of time spent in each memory segment versus each memory segment. Memory segments are defined symbolically by the module names, line numbers, and the application's procedure names.

Procedure Duration Measurement displays a histogram of an executing procedure. This histogram shows the programmer the minimum, maximum, and average execution times for a given procedure. With this information, the programmer can find timing bugs in an application caused by lengthy execution times of a particular procedure.

Program Event Count Measurement displays a histogram of programmer-defined events. The graph

shows the number of occurrences of each event as a percentage of all events taking place. With this information, the user can locate problems resulting from the incorrect number of occurrences of a particular event.

Procedure Timing Analysis allows the user to define a number of events, keeping a running list of the time between events. This allows the user to do a linear timing analysis of the application.

(List Price: \$395)

Requires: 320K RAM, two disk drives, PC-DOS 2.x, PC Probe board.

Atron
20665 Fourth St.
Saratoga, CA 95070
(408) 741-5900

CIRCLE 726 ON READER
SERVICE CARD

MAGIC MENU

A system utility allowing the user to establish a menu-driven interface for PC-DOS. *MAGIC MENU* consists of two program components, *MAGIC MENU* itself, and the *MAGIC MENU* Editor. Both components are written in assembly language.

Defined menus can be either disk or system memory resident, allowing the software to remain in memory during the operation of other programs. Passwords can be designated for any or all menu entries, providing as much system security as needed. In addition, the system can be set to automatically blank the display screen after a user-defined period has elapsed, preventing screen phosphor burn.

Each defined menu can be tailored with separate foreground, background, and border colors. Date and time displays can be set in various configurations, and text can be displayed in either 80- or 40-column formats.

(List Price: \$99)

Requires: 128K RAM, one disk drive, PC-DOS 2.x.

DeereSoft, Inc.
P.O. Box 1360
Melbourne, FL 32901
(305) 768-2477

CIRCLE 769 ON READER
SERVICE CARD

MTERM

An asynchronous communications program capable of transferring data with 2,400-bps modems or over direct connections at even higher rates. *MTERM* also offers automatic log-on



MAGIC MENU, Deeresoft, Inc.

SOFTWARE



MTERM, Micro-Systems Software, Inc.

and system configuration files and XFER, a special error-free binary file transfer program.

Advanced modem features, such as auto-dialing and auto-answer, are fully supported. Directory tables list the selected systems a user contacts, along with phone numbers. For single-key log-on repertoires, a macro-key feature assigns a user-defined sequence of up to 64 keystrokes to each of as many as 10 keys.

MTERM can maintain communications even while other activities are being performed. A user may exit from its terminal-mode screen to its command menu, execute commands for any of a number of functions (including DOS commands), and then return to the terminal mode at the point the work was interrupted. The software also provides easy selection of full- or half-duplex operation, print spooling, a screen print function, and more.

(List Price: \$79.95)

Requires: 664K RAM, one disk drive, PC-DOS, 2,400 bps modem.

Micro-Systems Software, Inc.

4301-18 Oak Cir.

Boca Raton, FL 33431

(800) 327-8724

(305) 391-5077

CIRCLE 749 ON READER SERVICE CARD

Artpak

A graphics program featuring drawing, animation, and music capabilities. Designed for the novice user, **Artpak** allows complex shapes to be drawn without entering screen coordinates or using peripheral devices.

The program's animation abilities permit hundreds of images to be stored on a single disk, allowing the images to be played back in sequence to

simulate motion. Special effects possible with **Artpak** include blinking, dissolves, trailing motion, and music. Images can be positioned precisely on the display using a "scene alignment window" feature.

The software is menu driven and uses single keystrokes for all commands.

(List Price: \$99)

Requires: 64K RAM, one disk drive, PC-DOS, color/graphics adapter.

PalSoftware Corp.

1104 Canterbury Dr.

Stevens Point, WI 54481

(715) 341-4547

CIRCLE 754 ON READER SERVICE CARD

PC ORACLE

A relational database management and applications development system for the IBM PC-XT and the

newly announced PC AT. The software is compatible with IBM's *SQL/DS* and *DB2* mainframe DBMS systems and is identical to the version of *ORACLE* used on mainframe and minicomputer systems.

PC ORACLE includes the relational DBMS, an application generator, a report writer, an integrated data dictionary, and *ORACLE Link*. This last component provides a software interface between the PC version of the DBMS and the IBM mainframe/DEC VAX minicomputer versions of *ORACLE*. This link permits an organization with several different computer systems to run the same DBMS system, exchanging data as needed though each system retains



PC ORACLE, Oracle Corp.

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- Written in Basic for easy modification
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- Recalculate Files
- Over 15,000 Lines of Source Code Given
- Houston Area Leaps of PC Users & Fred Blackman in his new book
- 3 Files Open Simultaneously
- Global Field Changes
- Key strings to numbers
- Real time transfers between files
- Retrieval on conditions for each field
- 14 Ways to Calculate Fields
- Transfer Data between files
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- Source Code Given
- Graphics Bar Charts
- Full Cursor Control

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You do not have to be a software engineer to use the system. The entire system is menu driven. You do not have to learn hundreds of commands. You do not have to keep reading the manual since all the options are displayed on the screen. If you write any application programs in Basic you can reduce your programming time by 50% or more. You probably waste 50% to 80% of your time coding the inputting of data. Storage of the data in files, retrieval of data, correction of data, screen design and other repetitive tasks. By using the database or spreadsheet to handle your repetitive tasks you will reduce your programming time by 50% or more. There are no royalties on applications.

- for IBM PC or XT with 128K
- Compatible with 192K & Microsoft Basic
- PC Jr. with 128K & Cartridge Basic

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SOFTWARE

the ability to process the data locally. Applications developed on one system can be run on the other systems without modifications or limitations.

(List Price: \$1,000)

Requires: 512K RAM, 10-MB hard disk, PC-DOS 2.x or 3.0.

Oracle Corp.

2710 Sands Hill Rd.

Menlo Park, CA 94925

(415) 854-7350

CIRCLE 774 ON READER
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FUND-IT

A series of personal financial planning modules designed to assist the user in planning for major events. The system projects future values based on entered costs and current inflation rates for various types of personal goals and objectives.

FUND-IT includes modules for:

- Education

Funding—Projects education costs for up to five students simultaneously over 30 years. The module features a college cost database and displays four alternate methods for financing a student's education. It prints monthly or annual cash flow reports.

- Fund Accumulation—

Computes the future value of a savings or retirement plan. It accommodates an existing balance, irregular contributions, various rates of return, and various in-

terest-compounding methods. This module can also display a balance on any date selected and the amount of interest earned.

- Special Events

Funding—Projects the future costs of a wedding, the purchase of a house, or other major financial event based on current costs and inflation rates. This module can display alternative methods of financing for up to five events over a 30-year period. It prints a cash flow report for each funding method.

- Mortgage/Loan Amortization—Computes and displays monthly mortgage payments, total interest, and principal paid. In addition, the module allows for "what if" analyses and prints a monthly or annual amortization table.

(List Price: Complete system, \$100)

Requires: 96K RAM, one disk drive, PC-DOS.

Sawhney Software

888 Seventh Ave.

New York, NY 10106

(212) 541-8020

CIRCLE 764 ON READER
SERVICE CARD

MATCHMAKER Series

A series of curriculum-based educational programs designed for students at both the elementary and junior high school levels. Software titles include *U.S. Government*, *World Histo-*



MATCHMAKER Series, American Educational Computer Inc.

ry, Biology, French, Science (three separate levels), *Spanish Vocabulary Skills*, and others.

The programs use a variety of quiz formats—multiple choice, matching, true/false, and completion questions—to test the student's knowledge in the various subject areas, with or without access to an answer key.

The *MATCHMAKER* programs are designed to parallel the student's classroom experience at each grade level. Each program uses high-resolution graphics, color, and animation to enhance the learning experience. Visual rewards and game play are offered to the user after successful completion of a series of questions.

(List Price: Each program, \$39.95)

Requires: 64K RAM, one disk drive, PC-DOS, color/graphics adapter.

American Educational Computer Inc.

2450 Embarcadero Way

Palo Alto, CA 94303

(415) 494-2021

CIRCLE 742 ON READER
SERVICE CARD

SNOBOL4+

An IBM PC implementation of the SNOBOL4 high-level programming language used on such mainframe systems as the IBM 370 and the Control Data 7600. *SNOBOL4+* encompasses all of the features of the mainframe version except for the FORTRAN output formats. It produces concise programs

SOFTWARE

for string, algebraic, and list processing, as well as other forms of nonnumerical computations.

The language is particularly well suited to applications requiring a high degree of pattern-matching ability because *SNO-BOL4+* allows a programmer to easily design match algorithms that would be more difficult to express with other languages. It contains an extensive set of string manipulation primitives, which are centered around the pattern matching concept; integer and double-precision real

number arithmetic is standard.

User-defined data types and functions allow *SNO-BOL4+* to be extended in such areas as list processing. External assembly language functions allow the user to exploit specific target hardware by permitting outside assembly subroutines.

(List Price: \$50)

Requires: 128K RAM, one disk drive, PC-DOS. *Catspaw, Inc.*

P.O. Box 1123

Salida, CO 81201

(303) 539-3884

CIRCLE 757 ON READER SERVICE CARD

GraphicC

A set of graphics routines callable from the C programming language, intended to help scientists and engineers display the results of scientific calculations. *GraphicC*'s 40 routines create and store plot or text slide data in the Tektronix 4,096- by 3,120-pixel format. They can be displayed on IBM's graphics monitors and can be printed using an Epson, IBM, C. Itoh, or Okidata printer.

Features of the software include a zoom mode that is capable of shrinking or enlarging images up to four times the original size. Five line types, eight different curve markers, two fonts, and linear, logarithmic, and contour plots are supported by the program. Created plot files are compatible with main-frame systems that are capable of supporting Tektronix terminals.

(List Price: \$150)

Requires: 192K RAM, two disk drives, PC-DOS, C-Ware DeSmet C compiler.

Scientific Endeavors

Rte. 4, Box 79

Kingston, TN 37763

(615) 376-4146

CIRCLE 720 ON READER SERVICE CARD

Direct Access

A hard disk management and access program allowing the user to execute

programs with a single keystroke. *Direct Access* organizes files stored on the hard disk into a user-defined menu system. Requiring no restructuring of the hard disk's organization, the program crosses subdirectory boundaries as needed, eliminating repeated keying. In users' systems equipped with internal clocks, *Direct Access* automatically boots date and time into the system.

Features of the program include menu screens, batch file processing, convenient one-key DOS command execution, function key usage, and menu security system.

(List Price: \$59.95)

Requires: 128K RAM, hard disk, PC-DOS 2.0.

Delta Technology

1325 Summit St.

P.O. Box 1104

Eau Claire, WI 54701

(715) 832-0958

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Worldmaster

A multilingual word processing program, allowing the user to create documents with two different character sets (languages) in the same file. Available character sets include all Latin-based languages, English, Hindu, Arabic, and Russian, among others. The user must specify when ordering which two



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character sets are required.
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Requires: 128K RAM,
two disk drives, PC-DOS.

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(718) 596-4100

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Bargain Software Package

Two disks offering 14 different and useful utilities.

The *Bargain Software Package* disks include a banner-printing program, several data management utilities, a one-key system reset, a biorhythm charting program, several games, and more.

(List Price: \$29.95)

Requires: 64K RAM, one disk drive, PC-DOS 2.0, color/graphics adapter.

LK Software

5 Hooker Ln.

Cos Cob, CT 06807

(203) 869-6707

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Business Tools

A collection of over 400 ready-to-use letters, business forms, and sample contracts. The pre-composed documents cover aspects of such areas as sales, credit and collections, employee relations and recruitment, purchasing, checklists, leases, contracts, and common business agreements. A set of

business data appendixes is included, providing a quick reference source for use in word processing applications.

(List Price: \$149)

Requires: 64K RAM, one disk drive, PC-DOS.

Knowledgeware

191 Chaparral Dr.

Paradise, CA 95969

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Employee Scheduler

A personnel management system featuring ASCII graphics screens not requiring a color/graphics adapter card. Data entry is performed by following simple fill-in-the-blank screen forms. Personnel can be assigned to jobs, departments, or locations for periods ranging from 1 day to 52 weeks, and assigned schedules for up to 10 weeks can be displayed at one time on the screen. Records for up to seven employees can also be simultaneously displayed.

Assignments charts can be printed simply by using the Shift-PrtSc key combination.

(List Price: \$50)

Requires: 64K RAM, one disk drive, PC-DOS.

*Data*Easy Software*

12 Skylark Dr., #18

Larkspur, CA 94939

(415) 927-0990

CIRCLE 733 ON READER
SERVICE CARD

PhoneChek

Telephone management software, using data entered from a phone company bill to analyze telephone use and costs. *PhoneChek* produces ten categories of reports, including summary and detailed reports for all calls, extensions, dates, area codes, and account codes.

The account code feature can be used to allocate costs to departments or projects. Professional offices such as attorneys or CPAs can use this feature to bill specific clients for phone charges. The software can also aid in determining the cost-effectiveness of using special long-distance telephoning services.

(List Price: \$279)

Requires: 64K RAM, one disk drive, PC-DOS.

XIOX Corp.

411 Borel Ave.

San Mateo, CA 94402

(415) 571-7911

CIRCLE 768 ON READER
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ESi-LAW

A law office management and accounting program for firms with up to ten attorneys. Features include time accounting, disbursements, billing, A/R aging, exception statements, trust-fund controls, general ledger, balance sheet, income statement, and more.

ESi-LAW accepts multi-

ple billing rates for each attorney and can generate management reports on an exception basis.

(List Price: \$6,000, Canadian)

Requires: 192K RAM, 10-MB hard disk, PC-DOS 2.0, color/graphics adapter, Epson printer.

ESi Computer Software Inc.

80 Chippewa Rd., #110

Sherwood Park, Alb.

T8A 3Y1 Canada

(403) 464-4095

CIRCLE 725 ON READER
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MS-DOS EMACS

A full-function implementation of the Gosling EMACS screen editor previously released for UNIX and VMS. Features include full-screen editing, multiple windows allowing several files to be edited simultaneously, macros, and a built-in compiled MLISP programming language. Other aids include full keybindings, powerful search and replace commands, automatic indenting, and parenthesis checking.

(List Price: binary code, \$375; source code, \$995)

Requires: 384K RAM, one disk drive, PC-DOS.

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Susan Glinert-Cole
Technical Editor,
PC Tech Journal

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Menu Manager

A hard-disk management system enabling the user to control access to a hard disk through definable menus. *Menu Manager* offers selective password protection that allows the user to protect chosen files, while leaving access to other data open. The program acts as buffer between the user and PC-DOS, executing any command or program compatible with PC-DOS 2.0 or greater.

To eliminate the danger of screen image burn-in, *Menu Manager* automatically clears the display after a few minutes of inactivity. It also displays the current time in the lower left corner of the screen.

(List Price: \$100)

Requires: 128K RAM, hard disk, PC-DOS 2.x.

Phoenix Systems, Inc.
668 51st St.

Sacramento, CA 05810
(916) 731-8224

CIRCLE 735 ON READER
SERVICE CARD

PROJECT REPORTER

A template for Lotus's 1-2-3 providing a flexible format for monthly reporting of a project's financial and summary status. Using interactive menus and macro commands, the reports can be customized to suit the user's requirements.

PROJECT REPORTER's preprogrammed report fields include monthly, year-to-date, and year-end project spending plans, as well as forecast, actual, and variance-to-forecast data for each of up to 11 departments involved in a project. The report also has space for comments, such as schedule status, work plans, and milestones. For product development projects, quarterly reporting of the estimated labor, burden, and material cost of the product is included.
(List Price: \$79.95; manual alone, \$19.95)

Requires: 256K RAM, two disk drives, PC-DOS, Lotus's 1-2-3, Ver. 1A.
Cinnamon Microsystems
P.O. Box 29494
Minneapolis, MN 55429
(612) 574-1697

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A PC-DOS implementation of the popular CP/M-80 program, which produces a calendar of events in a graphic monthly calendar format. It can be used as an appointment book and production schedule for one or several persons and/or tasks. Multiple calendars can be stored separately and are easily merged to produce master calendars.

Calendars are tailored to the needs of an individual

or an organization by means of a Parameter File, which gives the user complete control over all options and defaults including size, format, printer characteristics, and so forth.

(List Price: \$95)

Requires: 64K RAM, one disk drive, PC-DOS.

Clear Systems
3098 Santa Monica Blvd.
Santa Monica, CA 90401
(213) 394-7740

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dENHANCER

A series of *dBASE II* programs providing users with easy access to and manipulation of *dBASE II* data files without programming. Included in the software are the following separate programs:

- *dREPORTER*—A report generator allowing the creation of customized reports from *dBASE II* data files. Selection criteria can be specified to produce reports tailored to a user's particular needs in either printed or display form.

- *dANALYZER*—A tool for performing a variety of statistical analyses on *dBASE II* data files. The user can specify fields to be counted, summarized, or used in calculations.

- *dPRINTER*—A program permitting the user to create a printer selection menu for selecting various

combinations of character fonts, lines per inch, and form lengths.

dENHANCER includes its *dBASE II* source code. All of its components are menu-driven and can be executed from within a user's own command files.

(List Price: \$39.95)

Requires: 128K RAM, one disk drive, PC-DOS, *dBASE II* 2.4.

Information Software
33 Andover Ln.

Hicksville, NY 11801
(516) 822-2377

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A set of assembly language programs permitting *dBASE II* command files to directly access the 8087 math coprocessor chip. *d8087* provides *dBASE II* with computational accuracy to 18 significant figures, instead of the usual 10 figures, as well as offering improved performance speeds for mathematical functions.

d8087 occupies less than 4K of space in RAM and is compatible with all *dBASE II* versions.

(List Price: \$450)

Requires: 128K RAM, one disk drive, PC-DOS, *dBASE II*.

Midway Software, Inc.
1609 Bancroft Way
Berkeley, CA 94703
(415) 644-2369

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Wire Tree Plus, Networx

ACCESSORIES

TAXAN Tuner

An add-on tuner enabling any brand of composite video monitor with audio to be used as a standard television set. Because of the higher-quality CRT components used in most composite video monitors, the monitor-turned-television can be expected to produce a much sharper image than most regular television sets.

(List Price: \$129.95)

TAXAN Corp.
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City of Industry, CA 91748
(818) 810-1291

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An upgraded version of the popular Wire Tree spike and RFI suppressing power strip. The Wire Tree Plus

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DATA SPEC Easy Match Cable Kit, Alliance Research Corp.

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LETUS A-B-C
3790 El Camino Real,
#2006
Palo Alto, CA 94306
(415) 493-4306

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1. Please include the retail price, distribution methods, and details of both hardware and software requirements needed for an end-user to properly use your new product. For software especially, this includes required amount of RAM, number and type of disk drives, operating system(s) supported, and any peripheral equipment needed.
2. Releases should be typewritten double-spaced on one side of the paper. Copies of advertisements for the product may be included, but in most instances we need more information about a product than is typically included in an ad.
3. Include telephone contacts for marketing and technical questions.
4. If available, include black-and-white glossy photos of the product, 4 x 5 in. or larger.

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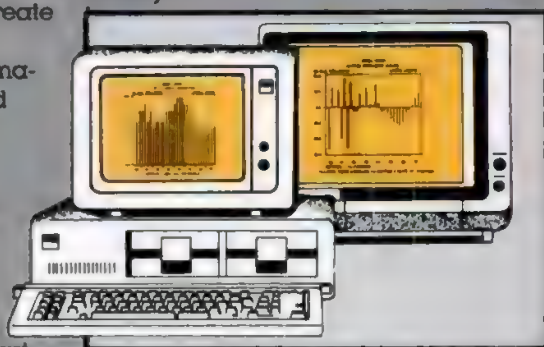
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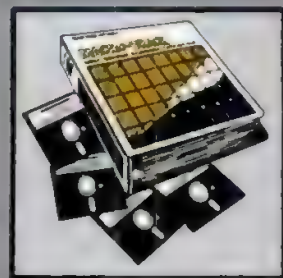
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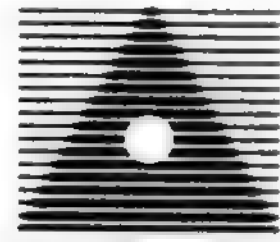
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Using IBM's Color Adaptor

These 11 tricks let you produce some very unusual effects using the standard IBM Color Graphics Adaptor.

IBM's standard Color Graphics Adaptor is rarely used to its full capacity; even IBM chose not to support the 16-color, 160- by 100-pixel graphics mode in its BIOS. (For an excellent demonstration of this low-resolution mode, check out Marty Smith's LORES.HEX program in the games section of CompuServe's PC SIG.) You can generate many exotic and little-used effects on your PC graphics board, and I'll show you programs that demonstrate some of them.

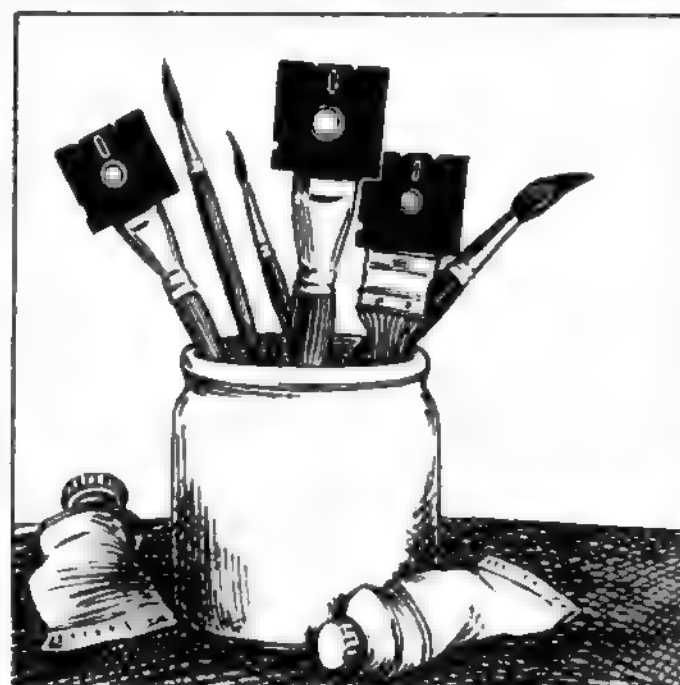
Equipment Testing

The first three programs generate signals for testing video equipment. BARS.BAS (see Figure 1) generates an approximation of the NTSC color bars used by broadcasters, along with a gray scale at the bottom of the screen for setting brightness on a monitor. While the luminance (brightness) levels of the bars do not resemble NTSC bars and the approximations the graphics board uses for the composite output may cause a 15-degree error from standard, this signal does add a professional look to the start of home videotapes.

CONVERGE.BAS (see Figure 2) generates both dots and crosshatches to check or adjust convergence on a color monitor or TV. (If you don't have an RF modulator to feed the TV but have access to a VCR, you can plug your composite video into

the video input of a video-cassette recorder and drive the TV from the VCR's RF output.)

MLTIBRST.BAS (see Figure 3) produces an output similar to a test signal



used for video alignment. This signal is a series of bursts of sine waves of equal levels and known frequencies, and you can use it to test the frequency response of a video amplifier, processor, or monitor. All the frequencies produced are digitally derived by dividing 14.318 MHz, which limits the choice of available frequencies. However, the frequencies are all extremely stable.

Since the PC's digital system and the available hardware on the graphics board cannot generate true sine waves, the program produces its bursts either as 50 per-

PROGRAMMING

cent duty-cycle square waves, or as rectangular waves with as close to a 50 percent figure as possible. The frequency response of the result is quite flat (within 1 db even at 7.16 MHz), and the majority of the energy in each burst is at the specified frequency.

You can test video amplifiers and processors by applying this signal and then looking at the output with an oscilloscope. You can test monitors by looking to see which bursts have lines that are visible (those above a monitor's response will turn gray), or you can scope the CRT drive for accurate measurements. An additional feature in the program allows you to turn the color burst alternately on and off by hitting the B key, which actuates the color killer in composite (non-RGB) color monitors or TVs.

Flight Simulator Colors

It is fairly easy to use BASIC to generate the colors seen on a composite monitor with the *Microsoft Flight Simulator*, which uses only the high-resolution (mono) graphics mode. The short demo program TWOLINE.BAS (see Figure 4) covers the basic techniques, and COMPCOLR.BAS (see Figure 5) shows all of the possible colors. These programs won't produce color on an RGB monitor, though, because they generate color by generating 3.58-MHz energy with various combinations of on and off signals repeated in groups of four pixels across the screen. The brightest colors are created when two adjacent pixels are on, then two off, thus generating the maximum 3.58-MHz energy. The horizontal position of the first pixel determines which of the four

```
100 ' BARS.BAS -- An approximation of NTSC standard
110 ' color bars and the four gray levels available.
120 '
130 KEY OFF:CLS:WIDTH 40:SCREEN 0,1
140 FOR R=1 TO 19:LOCATE R,3,0
150 COLOR 7,0,0:GOSUB 230:COLOR 14:GOSUB 230
160 COLOR 11:GOSUB 230:COLOR 2:GOSUB 230
170 COLOR 5:GOSUB 230:COLOR 4:GOSUB 230
180 COLOR 1:GOSUB 230:NEXT R
190 FOR R=20 TO 25:LOCATE R,8
200 COLOR 8:GOSUB 240:COLOR 7:GOSUB 240
210 COLOR 15:GOSUB 240:NEXT R
220 IF INKEY$="" THEN 220 ELSE CLS:END
230 FOR P=1 TO 5:PRINT CHR$(219);:NEXT P:RETURN
240 FOR P=1 TO 10:PRINT CHR$(219);:NEXT P:RETURN
```

Figure 1: BARS.BAS approximates NTSC standard color bars and gray levels.

```
100 ' CONVERGE.BAS -- BAR/DOT pattern for monitor
110 ' or TV convergence check or setup.
120 '
130 CLS:KEY OFF:SCREEN 2
140 FOR V=0 TO 200 STEP 20
150 LINE (1,V)-(640,V):NEXT V
160 FOR H=0 TO 640 STEP 40
170 LINE (H,0)-(H,200):NEXT H
180 FOR PV=10 TO 190 STEP 20
190 FOR PH=20 TO 630 STEP 40
200 PSET (PH,PV):NEXT PH:NEXT PV
210 IF INKEY$="" THEN 210 ELSE CLS
```

Figure 2: CONVERGE.BAS creates a bar/dot pattern for checking convergence on a TV or video monitor.

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```

100 ' MLTIBRST.BAS -- Displays specific frequencies for checking
110 ' monitor or system frequency response. Key 'B' switches
120 ' burst on or off on composite output. Exit with 'x'.
130 '
140 CLS:SCREEN 2:W=.5:DEFINT A-V:B1=&H1E:B2=&H1A
150 FOR H=640 TO 1 STEP -1
160 W=W+.5:H=H-5
170 FOR H1=H TO H-72 STEP -1
180 FOR WHT=1 TO W: LINE (H1,1)-(H1,190): H1=H1-1: NEXT WHT
190 H1=H1-INT(W+.5)+1:NEXT H1
200 H=H1:NEXT H
210 LOCATE 25,1: PRINT "1.59 MHz  1.79 MHz  2.05 MHz  2.39 MHz";
220 PRINT "  2.86 MHz  3.58 MHz  4.77 MHz  7.16 MHz";
230 A$=INKEY$:IF A$="b" OR A$="B" THEN SWAP B1,B2: OUT &H3D8,B1
240 IF A$(">")"x" AND A$(">")"X" THEN 230 ELSE CLS:END

```

Figure 3: *MLTIBRST.BAS displays specific frequencies for checking monitor or system frequency responses.*

possible brilliant colors appears on the screen. The color can be duplicated anywhere on the screen by ensuring that the new horizontal position is at 0, 4, 8, 16, or any multiple of 4 pixels away.

RGB Monitors

Of course, these tricks are all for composite monitors, and most serious graphics users have RGB monitors. Few exotic programs exploit these precise monitors. Some programs rely on the paging capability of the Color Graphics Adaptor, but few use it very extensively. Different display modes require different amounts of the 16K of RAM on the board. At the extreme, monochrome text mode requires only 2,000 bytes to make up a screen; so you can write and display *eight* pages of instructions for this mode.

You can use all the graphics characters IBM gave you in addition to the usual ASCII set. *ANIMATE.BAS* (see Figure 6) simply illustrates how easily smooth animation can be accomplished using this procedure. The IBM BASIC manual describes this process adequately in the section on Screen statements.

In the graphics modes, Screen 1 and Screen 2 characters may look as they did in text mode, but, in fact, they come from an entirely different source. Instead of the

ROM on the graphics board, they are in the BIOS ROM, where the processor must look up each one and put each pixel on the screen one dot at a time—just as it does with ordinary graphics. One way to show this is to add the jumper between the pads made for that purpose on the graphics board (grounding pin 18 of the ROM U33; the jumper is near the 2.2K resistor). Text characters become skinny, since each vertical line becomes 1 pixel wide instead of 2. Graphics mode characters are unaffected, however. An easier way to see these BIOS ROM characters is to implement *CHARSHOW.BAS* (see Figure 7).

CHARSHOW.BAS accepts entry of any character from the keyboard, looks it up in the BIOS and displays the address, and shows the character grossly expanded, exposing all its warts. These characters, incidentally, are identical to those displayed in text mode without the jumper. *INTLCVID.BAS* (see Figure 8) shows

how to double the number of characters your screen can handle.

Since the graphics mode characters are treated like normal graphics, you can use GET and PUT statements to do unspeakable things to them, such as mixing 40- and 80-column sizes, and moving them around. *BENTTEXT.BAS* (see Figure 9) offers a few examples.

High-Order Characters

Did you ever try to print characters above *CHR\$(127)* while in graphics mode, expecting those nice lines and blocks? Unless you defined them, you were probably surprised to see random patterns. The interrupt vectors from 124 through 127 decimal (7C–7F hex) must be set to indicate the start of your character table. *CHARDEFN.BAS* (see Figure 10) uses a dot-construction table at 54000h to define *CHR\$(128)* as a little *HI!*. Once you've run the program, at any time in

```

100 ' TWOLINE.BAS
110 CLS:SCREEN 2:OUT 984,26:FOR H=0 TO 635 STEP 4
120 LINE (H,0)-(H+3,199):LINE (H+1,0)-(H+4,199):NEXT H

```

Figure 4: *TWOLINE.BAS covers the essentials of using BASIC to create Flight Simulator-type color on a composite monitor.*


```

100 ' COMPCOLR.BAS -- A demonstration of color generation on a composite
110 ' (not RGB) color monitor using the HIGH RESOLUTION graphics mode.
120 '
130 CLS:KEY OFF:SCREEN 2:OUT &H3D8,&H1A:' Turn color burst on.
140 DEF FNV(L)=50+49*COS(L/51)
150 '
160 ' *** First, all combinations of 3 lines on, 1 off ***
170 '
180 FOR H=0 TO 200:FOR L=H TO H+45:LINE(L,FNV(L))-(L,FNV(L)+100):L=L+1
190 LINE(L,FNV(L))-(L,FNV(L)+100):L=L+1:LINE(L,FNV(L))-(L,FNV(L)+100)
200 L=L+1:NEXT L:H=H+52:NEXT H
210 '
220 ' *** Next, all combinations of 1 line on, 3 off ***
230 '
240 FOR H=217 TO 415:FOR L=H TO H+45
250 LINE(L,FNV(L))-(L,FNV(L)+100)
260 L=L+3:NEXT L:H=H+52:NEXT H
270 '
280 ' *** Finally, all combinations of 2 on, 2 off ***
290 '
300 FOR H=433 TO 630:FOR L=H TO H+45
310 LINE(L,FNV(L))-(L,FNV(L)+100):L=L+1:LINE(L,FNV(L))-(L,FNV(L)+100)
320 L=L+2:NEXT L:H=H+52:NEXT H
330 CIRCLE (320,33),70
340 LOCATE 4,39:PRINT "HIGH";:LOCATE 5,36:PRINT "RESOLUTION";
350 IF INKEY$="" THEN 350 ELSE CLS:END

```

Figure 5: COMPCOLR.BAS demonstrates color generation on a composite color monitor using the high-resolution graphics mode.

```

100 ' ANIMATE.BAS -- Demonstrates animation possible by paging.
110 ' Eight pages are available in 40-column monochrome text.
120 '
130 SCREEN 0:WIDTH 40:DIM A$(40):CLS:KEY OFF:DEFINT A-Z:D=1
140 INPUT "Display speed? 1=fast, 1000=slow ",S: CLS
150 '
160 ' *** First, write on all the pages ***
170 '
180 LOCATE 12,,0:A$=" * * * *"
190 FOR PAGE=0 TO 7:SCREEN ,,PAGE:CLS:FOR V=0 TO 2
200 LOCATE V*8+1+PAGE,PAGE+1:PRINT A$;:NEXT V
210 LOCATE 22,19:PRINT "/\";
220 LOCATE 23,18:PRINT "/--\";
230 LOCATE 24,17:PRINT "/| |\";
240 LOCATE 25,18:PRINT "| ";CHR$(219);"| ";
250 LOCATE 2,33:PRINT "Page";PAGE;:NEXT PAGE: ' Show page number.
260 '
270 ' *** Now flip the pages ***
280 '
290 SCREEN ,,PAGE MOD 8:FOR B=1 TO S:NEXT B:PAGE=PAGE+1
300 IF INKEY$="" THEN 290 ELSE SCREEN ,,0:CLS:END

```

Figure 6: ANIMATE.BAS demonstrates animation techniques using paging.

PROGRAMMING

```
100 ' CHARSHOW.BAS -- This will nearly fill the screen with a selected
110 ' character and indicate its location in the BIOS ROM, and the ROM
120 ' data from which the character is generated.
130 '
140 SCREEN 0:CLS:KEY OFF:WIDTH 80:DEFINT A-Z
150 LOCATE 25,25:PRINT "Character?";
160 A$=INKEY$:IF A$="" THEN 160 ELSE CLS
170 STARTADDR=&HFA6E+ASC(A$)*8:LOCATE 25,25:PRINT "Character: ";
180 DEF SEG=&HB800:POKE 3912,ASC(A$):DEF SEG=&HF000:' Show entry.
190 FOR N=0 TO 7:ROMADDR=STARTADDR+N
200 BYTE(N)=PEEK(ROMADDR):Y$=HEX$(BYTE(N)):R$=HEX$(ROMADDR)
210 IF LEN(R$)>3 THEN 220 ELSE R$="0"+R$:GOTO 210
220 IF LEN(Y$)>1 THEN 230 ELSE Y$="0"+Y$:GOTO 220
230 LOCATE N*3+2,1:PRINT "F000: ";R$;" ";Y$;
240 FOR V=0 TO 2:LOCATE N*3+V+1,15:GOSUB 290:NEXT V
250 NEXT N:GOTO 160
260 '
270 ' *** Turn block on for a "1", off for a "0" ***
280 '
290 IF BYTE(N) AND 128 THEN GOSUB 380 ELSE PRINT " ";
300 IF BYTE(N) AND 64 THEN GOSUB 380 ELSE PRINT " ";
310 IF BYTE(N) AND 32 THEN GOSUB 380 ELSE PRINT " ";
320 IF BYTE(N) AND 16 THEN GOSUB 380 ELSE PRINT " ";
330 IF BYTE(N) AND 8 THEN GOSUB 380 ELSE PRINT " ";
340 IF BYTE(N) AND 4 THEN GOSUB 380 ELSE PRINT " ";
350 IF BYTE(N) AND 2 THEN GOSUB 380 ELSE PRINT " ";
360 IF BYTE(N) AND 1 THEN GOSUB 380 ELSE PRINT " ";
370 RETURN
380 FOR P=1 TO 8:PRINT CHR$(219);:NEXT P:RETURN
```

Figure 7: CHARSHOW.BAS fills the screen with a selected character, while indicating its location in the BIOS ROM and the ROM data from which it was generated.

```
100 ' INTLCVID.BAS -- Demonstrates full interlace, 50 lines of
110 ' characters then 16-color 80 x 50 full interlace graphics.
120 '
130 DEF SEG=&HB800:WIDTH 80:SCREEN 0:OUT 980,8:OUT 981,3
140 FOR ADR=0 TO 8000 STEP 2
150 POKE ADR,33+(ADR/2) MOD 90:POKE ADR+1,7:NEXT ADR
160 IF INKEY$="" THEN 160:' Hit any key to go on.
170 FOR ADR=0 TO 8000 STEP 2
180 POKE ADR,219:POKE ADR+1,RND*16:NEXT ADR
190 IF INKEY$="" THEN 190 ELSE OUT 980,8:OUT 981,2:CLS
```

Figure 8: INTLCVID.BAS demonstrates 16-color, 80 x 50, full-interlace characters and graphics.

graphics mode, you can enter CHR\$(128), for example, by holding down the Alt key and entering 128, and the *HI!* will still be there. Lest you get ideas for profound messages, each charac-

ter is only 8 by 8 pixels.

The Motorola 6845 CRT Controller is not a microprocessor, but rather a group of specialized comparators and counters, many of which can be set to divide by any

of a large range of numbers. IBM sets these parameters to specific numbers for each mode. SCRNMV.BAS (see Figure 11) offers a set of three different movements that are accomplished without sig-


```

100 ' BENTTEXT.BAS -- Shows that characters in graphics mode are
110 ' treated the same exact way as any other pixel graphics.
120 '
130 SCREEN 1:CLS:DEFINT A-Z
140 '
150 ' *** First GET the larger characters ***
160 '
170 DIM O(20),P(20),S(20),Y(20),D(20),A(20),I(20)
180 LOCATE 1,1:PRINT "OAS":GET (0,0)-(7,7),O
190 GET (8,0)-(15,7),A:GET (16,0)-(23,7),S
200 '
210 ' *** Now GET the small ones ***
220 '
230 SCREEN 2:LOCATE 1,1:PRINT "YDPI"
240 GET (0,0)-(7,7),Y:GET (8,0)-(15,7),D
250 GET (16,0)-(23,7),P:GET (24,0)-(31,7),I
260 '
270 ' *** Display them ***
280 '
290 CLS:PUT (102,80),O:PUT (115,82),D
300 PUT (132,84),P:PUT (144,85),S:PUT (160,84),Y
310 PUT (118,99),D:PUT (135,98),A:PUT (150,97),I
320 PUT (167,96),S:PUT (190,94),Y

```

Figure 9: *BENTTEXT.BAS* shows that the graphics mode treats characters the same way it treats any other pixel graphics.

nificantly deviating from the parameters set up by IBM. Since horizontal frequency is unchanged in this demonstration, there is no risk to the monitor. First, vertical timing is cyclically altered, then horizontal position, then both. Any key will advance you through the program, but if you interrupt the program, you may find the screen set at a position you didn't expect. Try this and see how odd your program listings look. Nothing is endangered, and you can normalize by changing width or by rebooting. Since these movements are independent of the information displayed on the screen, you could even pull a harmless prank and add the routines to someone else's program.

This is just a sampling of some of the interesting things that you can accomplish with the IBM Color Graphics Adaptor. You'll find that the PC is capable of more truly astonishing graphics tricks than you thought. ■

```

100 ' CHARDEFN.BAS -- a character for CHR$(128), then
110 ' defines a row of them. Arbitrarily put at 54K.
120 '
130 DEF SEG=0
140 POKE &HE000,&H95:POKE &HE001,&H95
150 POKE &HE002,&H95:POKE &HE003,&HF5
160 POKE &HE004,&H95:POKE &HE005,&H95
170 POKE &HE006,&H94:POKE &HE007,&H95
180 '
190 ' *** Put the location in the interrupt table ***
200 '
210 POKE 124,0:POKE 125,&HE0:POKE 126,0:POKE 127,0
220 '
230 ' *** Now show it ***
240 '
250 CLS:SCREEN 1
260 FOR N=1 TO 10:PRINT CHR$(128);" ";NEXT N
270 '
280 ' *** Now, until a reboot is done, this is
290 ' character # 128 in graphics modes. ***

```

(See Figure 11 on following page)

Figure 10: *CHARDEFN.BAS* creates a character for *CHR\$(128)* and then defines a row of them.

PROGRAMMING

```

100 ' SCRNMV.BAS -- Demo using MC6845 port register access.
110 ' Hit any key to proceed to next step. Don't clear screen.
120 '
130 KEY OFF:WIDTH 80:SCREEN 0:FILES
140 '
150 PORT=2:FOR B=80 TO 100:GOSUB 270:NEXT B
160 FOR B=100 TO 80 STEP -1:GOSUB 270:NEXT B
170 IF INKEY$="" THEN 150 ELSE B=&H5A:GOSUB 270
180 '
190 PORT=7:FOR B=26 TO 30:GOSUB 270:NEXT B
200 FOR B=30 TO 26 STEP -1:GOSUB 270:NEXT B
210 IF INKEY$="" THEN 190 ELSE B=&H1C:GOSUB 270
220 '
230 OUT &H3D4,2:OUT &H3D5,85+RND*11:OUT &H3D4,7:OUT &H3D5,27+RND*3
240 IF INKEY$="" THEN 230
250 PORT=2:B=&H5A:GOSUB 270:PORT=7:B=&H1C:GOSUB 270:END
260 '
270 OUT &H3D4,PORT:OUT &H3D5,B:FOR DELAY= 1 TO 5:NEXT DELAY:RETURN

```

Figure 11: SCRNMV.BAS demonstrates MC6845 port register access.

(Programming column ends)

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Changing Border Colors

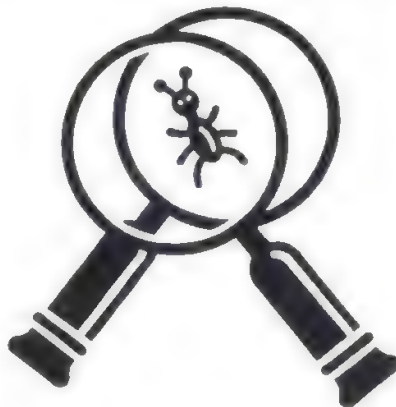
One of the most irritating things about running the majority of applications software packages on a color monitor is their inability to change the colors you have to work with. Many end up running in gray on white, which looks just terrible. As more and more users discover the benefits of running in color on a crisp RGB monitor, such programs will either have to include a utility for switching colors or will sag in popularity.

However, while increasing numbers of programs do allow you to adjust the foreground and background colors, almost none offers the option of setting the border color. So, even if you can change the main colors, you end up running your program against a funereal black border. Most users end up writing a tiny BASIC program that contains the single line

```
10 COLOR .,2:SYSTEM
```

(where 2=green, 3=light blue, 4=red, etc.). Before starting the applications program, the user simply runs this short BASIC program, which makes the color change, and then returns to DOS. This is best done automatically in a batch file.

However, this is a real brute-force way to do something as simple as sending one byte to one port. And it means that you need to have BASIC on your disk, which takes up too much unnecessary space—a



whopping 17,024 bytes under DOS 3.0.

I asked John Schnell, a leading color graphics expert, if he had a better way to do this, and he came up with a .COM file that does the trick nicely. We adapted it slightly for publication here. The assembly language instructions to turn the border light blue would be

```
MOV     AL,03
MOV     DX,03D9
OUT     DX,AL
INT     20
```

All this does is load a value into the AL register, load a port address into the DX register, send the value to the port, and exit back to DOS.

The easiest way to create this file is to use DEBUG. Just type in everything underlined in Figure 1 and hit the Enter

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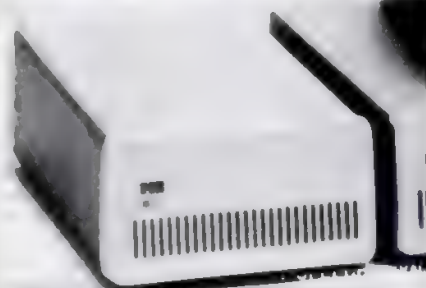
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key at the end of every line you type. The longest line is entered by typing in two characters, then hitting the space bar, then typing in two more characters, then

hitting the space bar again, etc., until you've typed all eight sets of two characters. Ignore whatever four numbers and letters appear where xxxx is. You may

enter either uppercase or lowercase letters; a BO is the same to DEBUG as a bO. To see your results once you've created the file, just get into DOS, type BORDER, and then hit the Enter key.

The border color created in Figure 1 is light blue, but you can create lots of different-colored borders by substituting numbers other than 03 after the 8A in the longest line of Figure 1. If you do this, give your differently colored files different names; do this by substituting other names in the line that begins with "-n". This file is a mere 8 bytes long and consists of the hex values: BO 03 BA D9 03 EE CD 20. It sure beats having to waste 17K by maintaining BASIC on your disk, and it works far more quickly than having to go in and out of BASIC.

FOR Play

I couldn't find any good use for the new DOS 2.0 FOR command until I needed to edit every one of my 43 CROSSTALK command files (.XTK FILES).

FOR allows you to execute a DOS command for each of the files in a specified set of files. It's real usefulness comes from the fact that the set of files can be specified using wildcard filenames. But FOR has two major problems: it has a syntax no sane person can remember, and it works only from within batch files.

The command

FOR %A IN (*.XTK) DO EDIT %A

would run my editor for each of the .XTK files, but who can remember the syntax, and who wants to create a special batch file each time this situation comes up?

I decided to create a general-purpose batch file that would allow me to do this kind of operation on any group of files using any program. The result is a batch file, which I call REPEAT.BAT, that contains only one line:

FOR %A IN (%2) DO %1 %A %3

The syntax for running the batch file is:

REPEAT program filespec
[/programswitches]

magnum p.c.

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USER-TO-USER

The first command line parameter becomes the name of the program to be run, the second parameter is the set of files to be worked on, and the third parameter is any switches that program may need after the program name. For example,

```
REPEAT EDIT *.XTK
```

would translate into the FOR command required to solve my *CROSSTALK* file editing problem (my editor requires no command line switches, so the third parameter was left off).

REPEAT is also useful for the many public-domain utilities that do not allow wildcard filenames.

David P. Sykes
Oakton, Virginia

Another tribute to the mighty batch file.

WHILE . . . WEND vs. INKEY\$
Here's a small but useful tip for BASIC programs. When most users want to poll the keyboard for a key press or input a single character from the keyboard, they include the line

```
100 A$=INKEY$:
    IF A$="" THEN 100
```

While this method certainly works, there are some disadvantages to it. A better choice would be

```
100 WHILE A$="" :
    A$=INKEY$:WEND
```

The second method is better because

- There is a small, but noticeable, decrease in the program size.
- The first method varies according to the line's number, while the second is inde-

pendent of any GOTOs (an advantage during renumbering).

- While debugging with the TRON trace command, the first method quickly fills the screen with <100>s, while the second shows just one <100>—a considerable advantage.

- The second method allows the addition of statements on the same line without any tedious IF . . . THEN . . . ELSE baggage, for example,

```
10 WHILE A$="" : A$=INKEY$:
    WEND : LOCATE X,Y : PRINT A$
```

rather than

```
10 A$=INKEY$: IF A$=""
    THEN 10 ELSE LOCATE X,Y
```

(etc.).

One final note—make sure the value of the variable you're using in the WHILE . . . WEND loop is null by inserting an A\$="" before you use it.

Michael Beauchamp
Waterloo, Ontario, Canada

The last two reasons above are the only valid ones. The difference in speed really isn't noticeable. And while there are better renumbering tools around, such as the one in BDS, the PC's renumbering is miles above truly rotten numbering systems like those on Apples. But anyone who has tried to TRON with an INKEY\$ knows this plays havoc with the screen. And, if you're trying to compress a program, it's better to leave out the unnecessary IFs.

INKEY\$ is really designed to allow program flow to continue unimpeded if no key is pressed. If you're looping through some tedious math that can be interrupted

```
A>DEBUG
-n BORDER.COM
-e100
xxxx:0100 5A.b0 8A.03 C7.ba 0A.d9 C0.03 74.ee 01.cd C3.20
-rck
CX 0000
:8
-v
Writing 0008 bytes
-q
```

Figure 1: The procedure for creating the BORDER.COM border-changing program using DEBUG.

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if necessary, or running a loop to put repeated graphics images on the screen, `INKEY$` can allow the program to continue running until a key is struck. But

`INPUT$(1)` can sit and wait for a one-character input, such as a menu selection or a Y or N. `INKEY$` has to be used when the user might hit a key that generates an

extended code (a two-character code where the first character is a null, or `CHR$(0)`).

For instance, run the following programs and hit the cursor keys as inputs. `INPUT$(1)` grabs only the first character, the null, while `INKEY$` reads in the whole code.

```
100 A$=INKEY$:
    IF A$="" THEN 100
110 PRINT "****";A$;"****"
120 GOTO 100
```

```
100 A$=INPUT$(1)
110 PRINT "****";A$;"****"
120 GOTO 100
```

In the following case, the `WHILE . . . WEND` method just spins the first value

When you write a program, debugging errors wastes time. `DEBUGGER.BAS` automatically shows you the line where an error occurs.

that you enter down the left edge of the screen unless you first take the trouble to null it:

```
100 A$=""
110 WHILE A$="":
    A$=INKEY$:WEND
120 PRINT "****";A$;"****"
130 GOTO 100
```

BASIC Debugging Aid

When you're writing a BASIC program, debugging errors without adequate tools can waste time. `DEBUGGER.BAS` (see Figure 2) is a short, very helpful program that shows you the error number and the line in which the error occurred. Best of all, it will automatically set up the trouble-

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USER-TO-USER

some line for you to edit.

David Klausner
San Jose, California

The BASIC interpreter is pretty good about telling you what errors it encounters and which statements were involved. It is fairly useful for programs with short lines; however, for long, complex program statements, having it say there's a syntax error somewhere within the densely packed 254 characters doesn't help much.

Some languages, such as Better BASIC, pinpoint the trouble with a small arrow.

Your trick of following the word EDIT with a period is a little-used but very valuable one. If you're going to include this in your program, however, the interpreter won't tell you what the error is. However, by adding two lines to the program

```
101 KEY 9, CHR$(31) +  
      "RUN 10000" + CHR$(13)  
10000 ERROR ERR
```

you can have BASIC describe the error to you. After you've run the original program and choked on an error, simply hit the F9 key and these new lines will spell out what the error was. As a matter of fact, you can even do this in direct mode—just get into BASIC, type the word ERROR followed by a low integer, and then hit the Enter key.

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```
100 ' DEBUGGER.BAS -- by David Klausner  
110 ON ERROR GOTO 140  
120 OPEN "e:test" FOR OUTPUT AS #1 ' (sample error)  
130 END  
140 PRINT "Error number";ERR;"in statement";ERL  
150 EDIT .
```

Figure 2: These lines, which can be added when developing a BASIC program, pinpoint errors and automatically load offending lines into the BASIC editor.

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PC Tutor

Shifty Key Trapping

Q: You recently suggested a routine that runs a subroutine after trapping the Ctrl-Break key combination (see "Break Trapping" in PC Tutor, PC, Volume 3 Number 11, page 441):

```
10 KEY 15, CHR$(4)+CHR$(70)
20 ON KEY (15) GOSUB 1000
30 KEY (15) ON
```

I tried to use this routine but couldn't get it to work. I use DOS 2.1, which you said would support this routine, but the capabilities you discussed aren't mentioned in my BASIC manual. Is there anything I can do to make this key-trapping routine work?

Robert Hendrix
Watkinsville, Georgia

A: This application of the KEY and ON KEY statements is discussed in the BASIC 2.0 manual and the PCjr's Cartridge BASIC manual. If your manual doesn't cover the subject, you probably have one of the unrevised BASIC 1.1 manuals without the updated pages, which describe new features in BASIC 2.0 and 2.1. Until BASIC 3.0's consolidated manual was released, IBM put the burden on users to order the revised pages. (For more on the BASIC manual situation, see "IBM Betters BASIC Book," PC, Volume 3 Number 20, page 38.)

The most likely problem is that the CapsLock key is turned on when you try to use the key-trapping routine. Whenever the CapsLock key is on or a Shift key is depressed, then flag &h40 is set. To detect the Ctrl key (flag &h04) when the keyboard shift is on, you have to take the other CapsLock flag into account in line 10 by using CHR\$(&h44) in place of CHR\$(4):

```
10 KEY 15, CHR$(&h44)+CHR$(70)
```



If you want to trap the Ctrl key when the keyboard is in either a shifted or unshifted condition, you have to include two KEY statements, such as these:

```
100 KEY 15, CHR$(&h04)+ . . .
110 KEY 16, CHR$(&h44)+ . . .
```

ROM Chips Ahoy

IBM now offers a new ROM chip that enables an early model PC with a 64K motherboard, called the PC-1, to act like a PC-2, which is able to boot up a hard disk easily. IBM calls this chip its "Early PC BIOS Upgrade Kit," and it was introduced to support the company's Cluster network. ComputerLand's stock number for the kit is IBM B4830.

Stan Franklin
Memphis, Tennessee

Thanks for the news. Installing IBM's chip will be a simple way of solving the problems of a reader who tried to use a hard disk with a PC-1 (see "Starting Up a Hard Disk," PC Tutor, PC, Volume 3 Number 10, page 393). I understand that this upgrade costs about \$60—a rather stiff price for the 5 minutes it takes to install an \$8 chip.

A Bundle of Batch Files

I often use batch programs in my work because DOS 2.0 allows batch programs to have many of the capabilities found in a programming language. Commands created as batch files can even be a more sophisticated set of tools than programmable keys. Here are a few examples of the batch files I use when working with a C language compiler.

My compiler works in two passes, called LC1 and LC2. I created a batch program, called C.BAT, that can run one pass after the other:

```
C.BAT
1 LC1 %1
2 LC2 %1
```

Now, when I type C MYROUT, the batch program calls on LC1 and then on LC2 to compile a program file I called MYROUT. This process is quicker and easier than typing the full instructions every time I want to run the compiler.

Next, here's a slightly more sophisticated version, which skips loading the second pass of the compiler if the first pass has found some errors. My C compiler uses DOS to return an error number when something goes wrong. Not all software supports this DOS feature, but in this case, I can use it in the following batch program:

```
C2.BAT
1 LC1 %1
2 IF ERRORLEVEL 1 GOTO END
3 LC2 %1
4 :END
```

During a compilation, if the first pass (LC1) fails, this batch program jumps directly to the :END label and ignores the second pass (LC2).

An even more sophisticated version of this C compiler batch program allows me to compile more than one file at a time.

When I do multiple compilations, I've found it helps to send the error messages to a file since there are often lots of errors in a group of files and the top messages would scroll off the screen. The batch program in Figure 1 adds that capability to the previous versions. Here's how CF.BAT works, line by line:

1. It creates a file named ERRORS and writes the word BEGIN to that file.
2. This is the BEGIN label.
3. If %1 is blank, then the batch program ends.
4. In the ERROR file, %1 identifies the file you are now compiling.
5. The compiler's first pass (LC1) runs, and any error messages are appended to the ERRORS file.
6. If there were errors on the first pass, then the batch program skips the second pass (LC2) and goes back to the BEGIN

label (line 2) to start compiling the next file on your list.

7. Otherwise (if there were no errors), it performs the second pass and appends these errors to the ERRORS file.
8. This is the SKIP label (see line 6).
9. SHIFT makes the new argument in %1 represent the next file on your list.
10. This leads back to line 2.
11. This labels the END (see line 3).

I can invoke this batch program by typing, for example:

```
C:\CF MAIN SUB1 SUB2 SUB3
```

Here, all four files (the main program and three subroutines) are compiled. When CF.BAT has finished running, I examine the ERRORS file to find and fix any mistakes.

This approach allows me to fix bugs

with ease using my text editor's two windows: One window holds the program file that needs fixing, and the other contains the ERRORS file for easy reference.

These batch programs can even be nested, with one batch file calling another. This is made possible by the command processor, so COMMAND.COM must be accessible on an active search path or on the default drive.

I've rewritten CF.BAT to produce the same results by calling my second batch file (C2.BAT) as a subroutine. The resulting batch file is CF2.BAT (see Figure 2). Line 5 of CF2.BAT temporarily invokes the command processor (COMMAND /C), which runs the compiler batch file (C2) that compiles a file (%1).

Please note that when you invoke a temporary secondary command processor, such as in line 5, the search path remains intact, even though the original search path is usually hidden if you change COMMAND.COM's search path by invoking a permanent command processor.

CF.BAT

```
1      ECHO BEGIN >ERRORS
2      :BEGIN
3      IF %1a == a GOTO END
4      ECHO Compiling %1 >> ERRORS
5      LC1 %1 >> ERRORS
6      IF ERRORLEVEL 1 GOTO SKIP
7      LC2 %1 >> ERRORS
8      :SKIP
9      SHIFT
10     GOTO BEGIN
11     :END
```

Figure 1: CF.BAT adds multiple-file compilation to earlier C-compiler batch programs.

CF2.BAT

```
1      ECHO BEGIN >ERRORS
2      :BEGIN
3      IF %1a == a GOTO END
4      ECHO Compiling %1 >> ERRORS
5      COMMAND /C C2 %1
6      SHIFT
7      GOTO BEGIN
8      :END
```

Figure 2: CF2.BAT nests two batch files by calling the second one as a subroutine.

One-Sided Regrets

Q: I've now outgrown my single-sided system and would like to switch over to a pair of double-sided drives. Do I need to buy one or two new adapters, or will the adapter already in my computer handle both double-sided drives?

James R. Ziemba
Iselin, New Jersey

A: Your current board should work fine when you take out your old drive and insert a pair of double-sided drives. Some jumpers, however, must be reset; have your dealer make this adjustment.

Programs and data on your old single-sided disks can be used in the new drives, preserving your present investment.

The PC Tutor solves practical problems and explains points of general interest. If you'd like to see your questions answered here, drop a line to PC Tutor, *PC Magazine*, One Park Avenue, New York, NY 10016.

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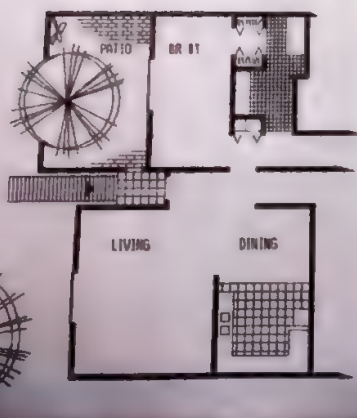
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I/O PLUS Ser., Clk., Splr., Ramdisk, opt. 2nd Ser., Par., & Game.
QUADRAM QUADBOARD, New Version, 64-384K, multifunc.
TECMAR CAPTAIN, 64-384K, multifunc.
TALLTREE J-RAM II, 0-512K, multifunc., w/J-RAM Software.
MICROLOG BABY BLUE II, 64-286K, 280 coproc., extra software.
ORCHID PC Blossom, 64-384K multifunction with optional PCnet Piggy-Back.
MAYNARD Sandstar, mod. Floppy & Hard Disc Controllers.

Graphic Cards

PERSYST BoB board.
STB Graphics Plus II, color & mono, w/par. port & software.
HERCULES Mono & color graphics cards support Lotus on IBM.
PLANTRONICS ColorPlus +, HiRes color bd., par. port w/software.
TECMAR Graphics Master, HiRes color & mono supports Lotus.
QUADRAM QUADCOLOR I & II, color cards.
PARADISE SYSTEM Multi-display or Modular Graphics Cards, color & mono, parallel port.

Software

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SORCIM / IUS A/P, A/R, G/L, inventory, order entry, payroll.



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64K RAMCHIPS For the IBM-PC compatibles and their boards.

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MICROPRO ChartStar.
DIGITAL RESEARCH Presentation Master.
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HAYES SMARTCOM II.
VM Relay.
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Shopping for Communications

The first step in buying a communications package that works for you is knowing what's available, for how much, and how it fits your needs. Here are six packages to consider.



Before you shop for a communications package, you'll want to decide what features are important to you, target your own level of technical expertise, and choose a program compatible with your communications hardware. Here are some tips to help you navigate your way through the myriad communications programs available.

PC-TALK III

Every PC user should have a copy of *PC-TALK III*. For communicating directly from the keyboard, it will serve you well.

It can capture information, save it to disk, and transfer files to and from disk

using the X/On-X/Off protocol, with or without the XMODEM error-checking protocol. Convenience features include automatic dialing and redialing (for Hayes Smartmodem and compatibles) and semiautomatic log-on.

You can get a copy of *PC-TALK III* from a friend or a user's group and then pay \$35 if you want it. (The manual is 70 pages of disk file that you print out.) You can also get a copy of the program directly from Headlands Press.

Omniterm 2

One step up from *PC-TALK III*, *Omniterm 2* allows unattended, remote operation. You can call the system from

a remote location and transfer files. In remote operation, it answers the phone, asks for a password, and then hands control over to the remote computer. *Omniterm 2* can also emulate a DEC VT100 or DEC VT52 terminal. This feature can be useful if the computer you're communicating with is programmed to take advantage of these types of terminals.

Omniterm 2's menus are well designed, following a consistent logic. The program also uses color well, enhancing readability and drawing the eye to important items on the screen.

Its features make *Omniterm 2* worthy of consideration by a wide cross-section of the market. Experienced users should be able to use it without looking at the manual, and beginners can get started with a minimum of effort.

Smartcom II

Part of the Hayes 1200B modem package, *Smartcom II* is also available separately. The original *Smartcom II* was roughly equivalent to *Omniterm 2*, but the newly released Version 2 has some new welcome flourishes.

Smartcom II can capture information and save it to disk, transfer files to and from disk, and operate remotely with password protection. For transferring files, the *Smartcom II* program uses the

X-On/X-Off protocol and can be run with or without Hayes's own error-checking protocol. The XMODEM protocol is also available, except in remote operation. *Smartcom II* will also let your PC emulate a DEC VT52 or VT102/100.

The program's menus are informative and easy to read. Novices will appreciate the on-line help and the manual, which is an excellent introduction to communications. The new version of *Smartcom II* also uses color highlights for color monitors.

The new batch-command feature lets you automate on-line sessions. You can, for instance, call Dow Jones News/Retrieval, log on, ask for closing prices on your stock portfolio, save the information to disk, and sign off—all with a single keystroke. A Wait command gives you automatic processing.

Smartcom II works with any of the

Hayes Smartmodems, and with some, but not all, Hayes compatibles.

Crosstalk XVI

Crosstalk XVI is a world-class program—it can do anything the others can do and more. The program uses the X-On-X/Off protocol and can use either the XMODEM protocol or its own proprietary protocol to check errors. It also emulates several terminals.

Also, *Crosstalk XVI* can write script files, which give you much the same capabilities as the *Smartcom II* batch commands but with greater flexibility. *Crosstalk XVI* is hard to outgrow, but it may overwhelm novices.

ASCOM

ASCOM is in the same advanced league as *Crosstalk XVI*. It can auto-dial,

auto-log-on, capture information and save it to disk, and transfer files directly to and from disk. *ASCOM* uses the X-On-X/Off protocol and can transfer files with or without the intervention of any of three error-checking protocols—

The logic behind
ASCOM's menus
may make it the
better choice for
novices.

XMODEM and two proprietary protocols. Unfortunately, *ASCOM* does not emulate any terminals, but it can handle remote operation, and it can create script files for automatic processing. Like its competitor *Crosstalk XVI*, *ASCOM* is hard to outgrow. And the logic behind its menus may make it the better choice for those who are new to computer communications.

Relay

Relay is another world-class entry. It has all the usual features of the other modems plus VT100 terminal emulation, extensive on-line help, and a built-in text editor. *Relay* also offers special features for communicating with mainframe systems. Error-checking protocols include two versions of XMODEM and a proprietary protocol to use with other VM Personal Computing products. The protocol works with other PCs running *Relay* and with mainframes running VM's *RELAY/VM* or VM's *RELAY/3270*.

If the foregoing minireviews haven't determined your choice of a communications package, they have nevertheless familiarized you with some of the important issues. You are now ready for further investigation and can be confident of being on a more equal footing the next time you make contact with your favorite dealer to discuss computer communications. ■



PC-TALK III

Headlands Press, Inc.

P.O. Box 862

Tiburon, CA 94620

(415) 435-9775

List Price: \$35

Requires: 128K RAM.

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Omniterm 2

Lindbergh Systems

49 Beechmont St.

Worcester, MA 01609

(617) 852-0233

List Price: \$175

Requires: 128K RAM.

CIRCLE 717 ON READER SERVICE CARD

Smartcom II

Hayes Microcomputer Products, Inc.

5923 Peachtree Industrial Blvd. East

Norcross, GA 30092.

(404) 449-8791

List Price: \$149

Requires: 128K available RAM.

CIRCLE 716 ON READER SERVICE CARD

Crosstalk XVI

Microstuf, Inc.

1000 Holcomb Woods Pkwy., Suite 440

Roswell, GA 30076.

(404) 998-3998

List Price: \$195

Requires: 96K RAM.

CIRCLE 715 ON READER SERVICE CARD

ASCOM

Dynamic Microprocessor Associates

545 5th Ave., Room 1103

New York, NY 10017

(212) 687-7115

Price: \$195

Requires: 48K RAM.

CIRCLE 714 ON READER SERVICE CARD

Relay

VM Personal Computing

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New York, NY 10017

(212) 686-1450

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- a discussion of configurations and pricing in the IBM family
- an examination of the new features in DOS 3.0
- an overview of IBM's PC Network
- a PC XENIX overview
- an evolutionary look at the AT's Intel iAPX 286 chip, and
- a complete PC AT bibliography

Implementations of Modula-2

PC Tech's on-going coverage of Niklaus Wirth's high-level programming language, Modula-2, continues with a comparison of three compilers for the language, one each from Logitech, Volition Systems, and the Modula Research Institute.

Floating-Point Conversion

The third and final installment in our series of articles on floating-point arithmetic includes a sampling of routines for binary-to-decimal floating-point conversion on the IBM PC.

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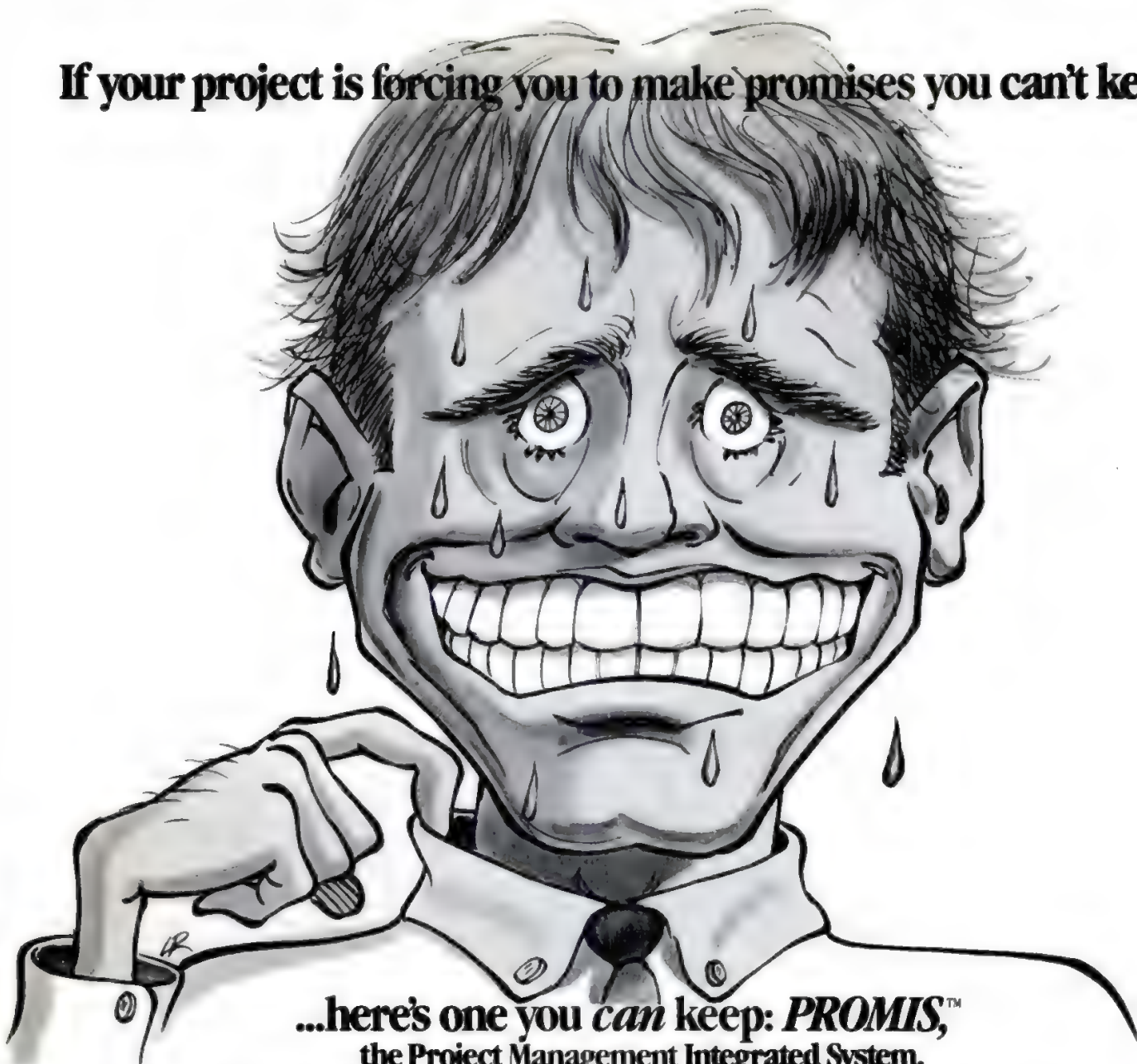
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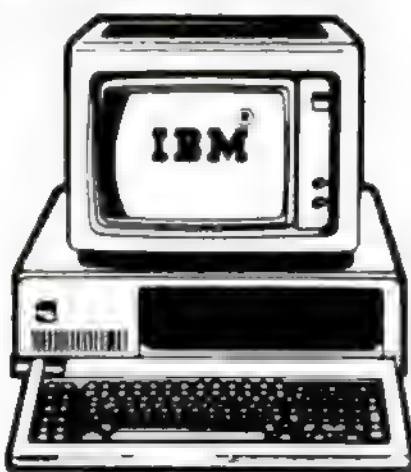
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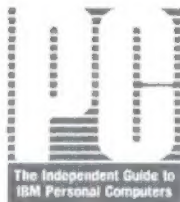
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Coming Up



Price Waterhouse Report

It's the same old story every year. On April 1, clients bring old shoeboxes and cigar boxes stuffed with receipts and cancelled checks to their overworked accountants and say, "Here, you figure out my taxes." Now, CYMA Corporation has come up with a way to replace those shoeboxes: a software program called, appropriately, the *Shoebox Accountant*. Price Waterhouse examines this package and finds it easy to install, to learn, and to use. It also has its share of limitations, however.

Multifunction Boards

The PC's five expansion slots are a valuable resource, used to hook up such basic computer accessories as the printer, monitor, or color monitor in addition to such goodies as extra memory, a mouse, or a hard disk. Manufacturers have helped PC owners conserve these valuable expansion slots—to sell more IBM-compatible expansion boards—by inventing the multifunction board, which squeezes several functions onto a single circuit board. Robin Webster, Dara Pearlman, Peter Feldman, and Glenn Hart review 13 of the basic "bread and butter" multifunction boards, which consist of RAM chips, I/O ports, a clock/calendar, and RAMdisks and print buffers.

Modems

A modem is a device that takes digital information from a computer and transforms it to analog form for transmission over telephone lines. It can also take an analog signal from a phone line and transform it to digital information compatible with your computer. Modem speed has been increasing while price has declined dramatically—perhaps to a level you can afford. Dan Rubis reviews eight board-level modems: Hayes Microcomputer Products Smartmodem 1200b, Rixon's PC 212A, Ven-tel's PC Modem 1200, Bizcomp's PC: IntelliModem, IDE Associates IDEAComm 1200, Qubiè Distributing's Qubiè PC Modem, and Novation's Smart-Cat Plus. But the final purchase decision is yours.

Parallel Printer Adapter

PC takes a look at the Parallel Printer Adapter Option, a simple way to use your PC as a general-purpose controller.

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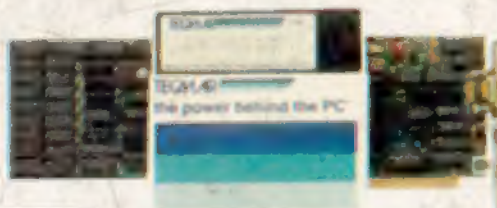


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